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SARGENTIA

A CONTINUATION OF THE
CONTRIBUTIONS FROM THE ARNOLD ARBORETUM
OF HARVARD UNIVERSITY

III

A REVISION OF THE GENUS SABIA COLEBROOKE

BY

LUETTA CHEN

WITH NINE TEXT-FIGURES

THE CHINESE AND INDO-CHINESE SPECIES OF ORMOSIA

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E. D. MERRILL AND LUETTA CHEN

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THE ARNOLD ARBORETUM OF HARVARD UNIVERSITY
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A REVISION OF THE GENUS SABIA COLEBROOKE

LUETTA CHEN

with nine text-figures

I. INTRODUCTION

One reason for selecting this group for monographic study was the difficulty encountered by all botanists in making species determinations of current collections, for many species were originally rather inadequately described, and the relationships of others were poorly understood. Another cogent reason was that no previous attempt has been made by any botanist to monograph the entire genus, all previous studies having involved merely the general generic considerations in standard works, treatments of species occurring in limited areas, and incidental descriptions of new species in connection with general floristic studies. The project thus involved a consideration of all characters that might prove to be of value in the establishment of minor groups, as well as those that might prove to be significant in the delimitation of species. The work has been handicapped by my inability to study certain types and historical specimens preserved in various European herbaria, as it was clearly inexpedient even to attempt to borrow types because of the unsettled conditions incident to the present war. Thus I have been limited in my studies to material preserved in the larger American herbaria, supplemented by such specimens as it has been possible to borrow from oriental institutions. Naturally all available literature has been intensively studied.

In the case of three species, *Sabia malabarica* Bedd., *S. tomentosa* Hook. f., and *S. Wardii* W. W. Smith, I have been obliged to rely largely on the published descriptions, although, through the courtesy of Sir W. W. Smith of Edinburgh and Dr. A. D. Cotton of Kew, who supplied me with flowers from type or authentic specimens, I was able to determine the disc characters of these species. I have seen but a single flower of *Sabia malabarica* Bedd. and no material representing the type collection of *Sabia pauciflora* Blume, although from Miquel's amplified description of the latter and his excellent illustration I feel satisfied in my interpretation of the species.

In adopting a basic classification utilizing certain disc characters, naturally one encounters difficulties when such characters are not critically considered in previously published descriptions. As a rule, the species of *Sabia* are notoriously difficult to interpret from published descriptions alone, as not infrequently one notes, in the course of a monographic study, that what one considers to be essential characters are not mentioned, or if mentioned, then sufficient details are not given by previous authors. I have recognized a total of fifty-three species,[1] a number in rather striking contrast to Bentham & Hooker's estimate of about ten species, Gen. Pl. 1: 414. 1862, and Warburg's estimate of about seventeen "zum

[1] Among the incomplete specimens that have been available to me for study there are several that I am convinced represent undescribed species, but because important parts are lacking I have deferred any consideration of these.

Teil schlecht unterschiedene Arten" in Engler & Prantl, Nat. Pflanzenfam. 3(5): 370–371. 1895.

Sometime previous to his death in August, 1933, possibly as early as 1920, when he published a plate and description of *Sabia latifolia* Rehd. & Wils., Doctor Otto Stapf studied the Indian and the eastern Asiatic species as represented in the herbarium of the Royal Botanic Gardens, Kew. He prepared two provisional keys, one to ten species found in India and Burma, the other to twenty-four species occurring in China, Japan, and Formosa. In these keys he indicated one new species from Burma and ten from China, but he apparently never prepared the technical descriptions of these eleven species, or if he did so, the descriptions were never published. My first knowledge of Stapf's work, other than noting one of his binomials on a photograph of a Kew sheet in the Britton Herbarium, New York Botanical Garden, where Professor Rehder and Dr. Merrill recognized the handwriting as that of Dr. Stapf, was the surprising fact that some Japanese botanist, working at Kew previous to 1936, had copied Stapf's provisional key to the eastern Asiatic species and published a Japanese translation of this as an anonymous paper.[1] There is no evidence that Stapf ever intended to publish these keys in the form in which he prepared them, as both are clearly indicated as "provisional."

I had an English translation of this key prepared in Cambridge, and later received another translation courteously prepared by Dr. Hiroshi Hara of Tokyo. Dr. A. D. Cotton of Kew kindly transmitted copies of both of Stapf's provisional keys, and Dr. Hara's literal translation of the Japanese text appertaining to the Chinese and Japanese species is practically identical with Stapf's original, a clear indication that this anonymous Japanese paper was based on Stapf's provisional key. The only essential differences between the two keys are in the inclusion of *Sabia transarisanensis* Hayata of Formosa, *Sabia dumicola* W. W. Smith of Yunnan, and the proposal of two groups, *Dolicostylae* and *Leptandreae*, in the Japanese text.

The most unfortunate aspect of this occurrence, involving a type of "publication" of binomials most unusual in botanical literature, is that the anonymous Japanese author not only proposed ten new binomials, all as *nomina nuda*, but that he erroneously credited these to S. T. Dunn, rather than to the actual author of the provisional key, Dr. Otto Stapf. Dr. Cotton states that there are in the Kew herbarium two provisional keys prepared by Dr. Stapf, these having been placed in the herbarium by Mr. Sealy in 1933, after Dr. Stapf's death, and marked as the latter's work.

In the one appertaining to the eastern Asiatic species, the names appearing in the Japanese key are recorded. In only a few cases did Dr. Stapf write the names on the herbarium sheets, but he did write them on the species covers and arranged the latter in the sequence of his keys. Mr. Dunn's name and handwriting does not appear on any of the sheets or elsewhere. Thus some Japanese botanist [2] working at Kew, either before or after Dr. Stapf's death, in copying the provisional keys, mistook Dr. Stapf's work for that of Mr. Dunn, and in translating the key into Japanese attributed the binomials to Dunn by error.

[1] **Anonymous.** [Key to the Far Eastern species of Sabia.] Acta Phytotax. Geobot. **5**: 76–78. 1936.

[2] While this can be treated only as an anonymous publication, in view of the absence of definite information as to who actually prepared the translation, the evidence at hand indicates that the author was Dr. G. Koidzumi, editor of the Acta Phytotaxonomica Geobotanica.

These binomials, being printed in a key composed otherwise wholly of Japanese characters and unaccompanied by descriptions, are *nomina nuda;* they are *Sabia acutisepala, S. fasciculata, S. gaultherifolia, S. olacifolia, S. omeiensis, S. pallida, S. rotundata, S. sinensis, S. spinosa,* and *S. subcorymbosa.*

Fortunately, I am able to account for most of these species, as duplicate specimens of many of the individual collections actually named by Stapf at Kew are available in American herbaria, while in the case of a few species single flowers and for several of the sheets actual photographs were received from Kew through the kindness of Dr. A. D. Cotton. The available material representing *Sabia acutisepala* and *S. rotundata* is so incomplete that I have not been able to determine the status and relationships of these and have merely included the names in the list of doubtful and excluded species at the end of this paper.

After an intensive study of all data and material available to me, and despite a few reductions of previously proposed species, I recognize fifty-three species, twenty-four of which (including certain species named in the Kew herbarium by Stapf and by Lecomte, but not hitherto described) are herein described as new; most of these previously undescribed species are from China. Even before the reference collections of the Arnold Arboretum were vastly increased by very large and important accessions in the past few years, through field work prosecuted in China by representatives of various Chinese institutions and in part supported by modest grants from the Arnold Arboretum, it was manifest that the genus *Sabia* reached its highest development in number of species in China. Previous to 1930 and possibly as early as 1920, Dr. Stapf had indicated in his then unpublished key that twenty-four Chinese species were known to him and represented in the Kew Herbarium. More than half of the now known species are confined to that country, with eleven known from India (including Burma), while in other regions to which the genus extends, such as Japan, Formosa, Indo-China, Thailand (Siam), the Malay Peninsula, Sumatra, Java, Borneo, the Philippines, the Moluccas, New Guinea, and the Solomon Islands, the species are few in number, often only one or two in each region mentioned. It may be confidently expected that additional species will be found in China as exploration progresses, but it may be doubted if many additional new forms will be found in the periphery of the generic range, especially in the east and south, such as Japan and Formosa, the Philippines, Malaysia, and Papuasia.

II. GENERAL HISTORICAL REVIEW

The genus *Sabia* was proposed, described, and illustrated by Colebrooke, Trans. Linn. Soc. **12**: 355. *t. 14.* 1819, the single species known to him being *Sabia lanceolata* Colebr., a native of Silhet; the source of the generic name was the Bengalese vernacular name *Sabjá-lat.* He placed the genus under the Linnaean system in the Pentandria-Monogynia. Between 1818 and 1941 about forty-five species were described, some of which have previously been reduced to synonymy, while others have been shown to appertain to genera other than *Sabia,* some even to genera in other families than the Sabiaceae. No intensive study of all representatives of the genus has previously been attempted.

In the first edition of Roxburgh's Flora Indica (that of Carey and Wallich) 2: 308–312. 1824, Wallich included Colebrooke's species and described two new ones from Nepal; these descriptions do not appear in the second edition of Roxburgh's work, 1832, which was limited to that author's own text. In 1855 Hooker f. and Thomson, Fl. Ind. 209–211. 1855, increased the number of Indian

species to seven. An additional one was described from southern India by Beddome, Ic. Pl. Ind. Or. **1**: 39. *t. 177*. 1874, and finally Hooker f., Fl. Brit. Ind. **2**: 1–3. 1876, considered ten species, including one from the Andaman Islands, which, however, was later shown to belong in the euphorbiaceous genus *Blachia*. In various local floras appertaining to parts of India issued up to 1937, no additional species are included, but in 1917 W. W. Smith, Notes Bot. Gard. Edinb. **10**: 63. 1917, described a single new species from Upper Burma.

One species was described from Java by Blume, Bijdr. 29. 1825 (as *Meniscosta javanica* Blume), but on re-studying it twenty-five years later, Mus. Bot. Lugd.-Bat. **1**: 369. 1851, he correctly reduced his genus *Meniscosta* to *Sabia* and at the same time briefly described an additional new species from Sumatra and another from the Moluccas. Miquel, Fl. Ind. Bat. **1**(2): 618–619. 1859, accepted Blume's three species of *Sabia* with very abbreviated descriptions, and three years later, Fl. Ind. Bat. Suppl. 520–521. 1862, described three new ones from Sumatra. Still later he provided detailed descriptions and excellent illustrations of several of the Malaysian species, Illus. Fl. Archip. Ind. 71–73. *t. 31–33*. 1871; at the same time he reduced two of his own Sumatran species, *Sabia floribunda* Miq. and *Sabia densiflora* Miq., to *Meliosma simplicifolia* (Roxb.) Walp. Stapf, Trans. Linn. Soc. II. Bot. **4**: 142. 1894, extended the range of *Sabia parviflora* Wall. to Borneo, while in 1901 Warburg, in K. Schumann and Lauterbach, Fl. Deutsch. Schutzgeb. Südsee 425, described a single species from New Guinea. King, Jour. As. Soc. Bengal **65**(2): 454–455. 1896 (Mater. Fl. Malay. Penin. **2**: 740–741), extended the ranges of *Sabia sumatrana* Blume and *Sabia limoniacea* Wall. to the Malay Peninsula and disposed of *Sabia viridissima* Kurz by transferring it *Blachia* of the Euphorbiaceae, as *B. viridissima* (Kurz) King, at the same time calling attention to the fact that Kurz's herbarium material, in part, represented *Erythropalum scandens* Roxb. Ridley, Fl. Malay Pen. **1**: 513. 1922, recognized the same two species for the Malay Peninsula as did King. For the Philippine Islands, C. B. Robinson described one species from Luzon, Bull. Torr. Bot. Club **35**: 70, 74. 1908, and a year later Elmer, Leafl. Philip. Bot. **2**: 579. 1909, described a second one from Negros. Lecomte, Fl. Gén. Indo-Chine **2**: 2. 1908, extended the range of *Sabia parviflora* Wall. to Indo-China, reducing *Sabia Harmandiana* Pierre to synonymy, yet at the same time giving the latter varietal status (*in nota*), while Craib, Fl. Siam. Enum. **1**: 340. 1926, recorded *Sabia Harmandiana* Pierre from Thailand (Siam), considering that in its pubescent inflorescences it was specifically distinct from *S. parviflora* Wall., which has glabrous inflorescences.

Four species were recorded from China in the preceding century, and in the present century, through the work of Diels, Hemsley, Lecomte, Dunn, Léveillé, Rehder and Wilson, and W. W. Smith, this number was considerably increased, attaining a total of approximately twenty, until Rehder, Jour. Arnold Arb. **14**: 224. 1933, **15**: 309. 1934, by an intensive study of Léveillé's types, indicated that four so-called species of *Sabia* really belong in *Orixa, Iodes,* and *Gardneria,* of the Celastraceae, Icacinaceae, and Loganiaceae respectively, while two others were reduced to synonymy under *Sabia*. Two species occur in Formosa and one in Japan proper.

From this brief review it will be noted that the published descriptive data are widely scattered. No botanist who has described incidental species has apparently even attempted a general survey of the entire genus (other than the possibility that Stapf did this in part), and as a result there is a great lack of

coordination in the treatments by various authors. Thus, when it was observed that there are apparently excellent differentiative characters in the floral disc, in a genus where striking differential specific characters are often obscure, it developed that, particularly in many of the older published descriptions, no mention or very casual mention had been made of the disc characters. In a study of this type, where certain floral characters have been shown to be significant, it is most essential, in the interpretation of the older described species, that these characters be re-examined; this can be done only when the investigator has access to type material or authentically named specimens.

III. GENERIC SYNONYMY

The generic synonymy is relatively simple. Colebrooke's description and illustration of the type species, *Sabia lanceolata* Colebr. Trans. Linn. Soc. **12**: 355. *t. 14*. 1819, clearly indicate the essential characters of the group. Blume, Bijdr. 29. 1825, proposed the genus *Meniscosta,* with a single species, which, twenty-six years later, Mus. Bot. Lugd.-Bat. **1**: 369. 1851, he correctly reduced to *Sabia* Colebr. In the meantime, Dietrich, apparently through a *lapsus calami,* Syn. Pl. **2**: 923. 1840, had used the variant spelling *Menicosta. Enantia* Falconer, Hook. Jour. Bot. **4**: 75. 1842, was incidentally published without a binomial, based on material from India. This is unquestionably a synonym of *Sabia* Colebr., where it was placed by Bentham and Hooker f. Gen. Pl. **1**: 414. 1862. *Androglossum* Champ. Hook. Jour. Bot. Kew Gard. Miscel. **4**: 42. 1852, based on a specimen from Hongkong, was correctly reduced by Seemann, Bot. Voy. Herald 362. 1857, to *Sabia* Colebr., but Champion's type species is not the same as *Sabia paniculata* Edgw., where Seemann placed it. A slight variant in the generic name is *Androglossa,* as used by Dalla Torre and Harms, Gen. Siphon. 300. 1901.

IV. MORPHOLOGY

The representatives of the genus *Sabia* are scandent or suberect, rarely erect, and, except for a single species, unarmed shrubs. Most of the species are evergreen, some being deciduous, and in these latter the flowers appear before or with the young leaves. The terete branches and branchlets are entirely glabrous or sometimes more or less pubescent; lenticels may or may not be present. Lecomte[1] states: "Toutes les espèces du genre *Sabia* possèdent de jeunes rameaux très finement striés en long sur le sec, et cette particularité est due à la présence de rayons médullaires dont les cellules ont une membrane épaissie et lignifiée. Ces rayons se continuent habituellement en dehors du bois dans le liber, de telle façon que, par la dessiccation et la contraction des éléments mous de l'écorce sur ces côtes longitudinales, une fine striation se dessine très nettement." This is in general an excellent statement of the case.

I also quote Lecomte's statement (op. cit. 673) regarding the axillary buds which are characteristic of most species: "En outre, dans toutes les espèces, chaque feuille porte, à son aisselle, deux bourgeons superposés et d'inégale valeur; le plus voisin de la feuille, qui se développera le premier et donnera toujours un pédicelle floral, ne possède pas d'appareil protecteur; le plus élevé, se développant plus tard et devant par conséquent présenter une période de vie latente, est protégé par des écailles dont le nombre, la forme et l'épaisseur varient avec les espèces et constituent une pérule (de Mirbel). Chacun des ces bour-

[1] Bull. Soc. Bot. France **54**: 672–673. 1907.

geons ne donnera qu'un rameau feuillé et, à l'aisselle de chacune des feuilles de ce rameau, on retrouvera la même dualité de bourgeons signalée plus haut. Quand le bourgeon floral ne se développe pas, comme dans le *S. limoniacea* Wall., c'est le bourgeon pérulé qui fournit l'inflorescence, mais une inflorescence à petites feuilles, dans laquelle les pédicelles floraux entraînent, par leur développement, la réduction de l'appareil végétatif. Il en est de même et, d'une façon plus accentuée, dans le *Sabia Menicosta* Bl." The bud-scales are in general ovate, broadly ovate, or lanceolate, pubescent or glabrous, the margins eciliate or shortly ciliate.

Sabia japonica Maxim. is the only known species where some of the leaf buds and the young branchlets are subtended by short, often somewhat thickened, spine-like structures, these being apparently formed by the persistent basal portions of the petioles, which to a certain degree elongate below the abcission layer and become thickened and indurated.

LEAF: The leaves are simple, alternate, penninerved, petiolate, exstipulate, and may be pubescent or glabrous, in few species being minutely and very obscurely reddish-glandular on the lower surface. They vary from membranaceous to coriaceous in texture; they are always entire, with the margins in most species narrowly cartilagineous or scarious-cartilagineous, often very narrowly revolute, sometimes ciliate or minutely erose, but never toothed. The lateral nerves are mostly slender, usually more or less distinct, often raised beneath, spreading or curved, and arcuate-anastomosing, the secondary and tertiary veins varying considerably and forming a lax or compact, distinct to more or less obscure reticulation.

INFLORESCENCES: The inflorescences are always axillary and mostly solitary. The simplest form, and this largely confined to the deciduous species wherein the flowers and leaves are coetaneous or the flowers appear just after the leaves are formed, consists of solitary pedicelled flowers, or sometimes from one to three flowers in an axillary fascicle. In a few species the flowers are arranged in simple racemes. In most of the species the flowers are cymose or in the simpler forms umbellate or umbellate-cymose, the individual cymes being solitary, often slenderly peduncled and simple or compound; in other species the cymules, few to many in number, are racemosely arranged in short to greatly elongated, usually narrowly paniculate or racemiform-paniculate inflorescences, occasionally these compound inflorescences bearing a few small leaves subtending the secondary axes. The small flowers, always pedicellate, are subtended by small, linear or lanceolate, persistent or deciduous, pubescent or glabrous bracteoles.

FLOWERS: The flowers are always perfect, regular, normally 5-merous, rarely 4- or 6-merous, small, and vary in color from green, greenish-white, or white to yellow, pink, red, or purple. The opposition between the floral parts is striking, the petals being opposite the sepals, the stamens opposite the petals.

CALYX: In general, the persistent calyx is small, pubescent or glabrous, with or without 1 or 2 minute bracteoles at the base, and normally 5-partite. Warburg, Bentham & Hooker, Hooker f., Ridley, and others state that the calyx is rarely 4-partite, but I have observed only 5-partite calyces. The sepals are thin to fairly thick, pubescent or glabrous, in some species minutely and obscurely punctate-glandular with colored dots, mostly ovate, broadly ovate, subrotund or oblong, mostly equal but in some species distinctly unequal in size,

3–5-nerved, the nerves prominent or obscure, the tips acute, obtuse, or broadly rounded, rarely emarginate, the margins ciliate or eciliate.

COROLLA: The petals are normally five in number, exceptionally four or six petals being noted, but on the same plant with these one notes typically 5-merous flowers. They are always free, imbricate, opposite the sepals, varying in shape but mostly oblong, lanceolate, broadly ovate, or broadly obovate, sometimes suborbicular-obovate or elliptic. In a few species they are strongly narrowed upward; the apices vary from broadly rounded or obtuse to subacute or even slightly acuminate. In most species the petals are deciduous, but in some they persist at the bases of the maturing carpidia. They are mostly rather thin, 3–9-nerved, the nerves rather prominent or obscure, and with or without numerous, small, often obscure, reddish-glandular dots. Their margins may be glabrous or shortly ciliate, but other than for these short marginal hairs they are always glabrous.

STAMENS: The stamens are free, opposite the petals and normally 5, rarely 6 and even more rarely 4, equal or subequal, all antheriferous and fertile. The filaments are long or short, glabrous, slender or somewhat thickened, often complanate and more or less widened below, sometimes obscurely and minutely reddish glandular-punctate. The anthers are always small, didymous, ovoid or oblong, the cells separated by a thickened connective; they may be introrse or extrorse. The pollen-grains are globose to ellipsoid, when globose varying from 24 to 31 microns in diameter, when ellipsoid 27–33 by 22–29 microns in size. The surface varies from almost smooth to finely, medium, or even massively pitted, the pores being rounded-oblong. These observations were made on the pollen of six species, *Sabia philippinensis* C. B. Robinson, *S. parviflora* Wall., *S. javanica* (Bl.) Backer, *S. campanulata* Wall., *S. kachinica* Chen, and *S. lanceolata* Colebr., none being closely allied to each other, with the exception of the first two.

DISC and GLANDS: From numerous dissections and comparisons, I conclude that the disc provides dependable sectional characters. The disc characters, as a matter of fact, impress me as being more dependable and significant than the long or short styles, or whether the species be deciduous or evergreen, or the flowers solitary or in more or less compound inflorescences. The disc varies in shape and its margins are characteristic; some are cup-shaped, with or without projecting ribs, shallowly to deeply lobed, the lobes being small, acute, obtuse or rounded; some are tumid, with or without projecting ribs, the margins smooth, annular or at most obscurely crenate or wavy, never distinctly toothed. Another important character peculiar to certain species is the presence of small or minute glands arising from a more or less pronounced thickening in the disc-body. These glands are either disciform or irregularly disciform, never numerous, generally 2–5, inserted on the sides or on the tips of the disc-lobes or in some species on the sides of the disc or on the median parts of the projecting ribs. These glands have been overlooked by most botanists, but Baillon, Hist. Pl. **5**: 345. 1874, states: "Les filets sont insérés à la base d'un pied cylindrique qui supporte le gynécée et qui s'épaissit dans l'intervalle des étamines en cinq côtes saillantes dont l'extrémité supérieure proémine quelquefois en haut à la façon d'une glande alternipétale." Warburg, in Engler & Prantl, Nat. Pflanzenfam. **3**(5): 371. 1896, states: "Frkn. von einem kurzen, kronenartig 5-spitzigen Discus umgeben, die drüsigen Spitzen mit den Stb. alternierend." These are the only two authors who, to my knowledge, have discussed the glands.

OVARY: The superior ovary is commonly more or less immersed within the disc. It is ovoid or subconical, rarely pyramidal, pubescent or glabrous, consisting, as far as I have observed, of two carpels, although Baillon, Warburg, Bentham & Hooker f., King, Ridley, and others report 2- or 3-carpellary ovaries, and Bentham, Fl. Hongk. 70. 1861, speaks of the ovary as "1- or 2-celled." The carpels are laterally compressed and opposite, more or less coherent at the ventral side. The ovules are 2 in each carpel, usually superimposed on the placenta.

STYLES and STIGMAS: The styles are normally united for their whole length at anthesis, varying in length from 0.2 mm. to 5 mm., but as the fruits develop the styles usually separate from the base upward and are ultimately quite free. At anthesis they are strictly terminal, but in the developing carpel they are persistent and remain lateral and almost basal on the adaxial side of the usually somewhat inequilateral carpidium. They are mostly glabrous, in a few species sparingly pubescent, narrowed upward, occasionally minutely and obscurely reddish punctate-glandular. The stigmas are minute, terminal, and rounded or capitate.

FRUIT: The fruit consists of two carpels, one of which frequently aborts. The individual carpidium is drupaceous, more or less compressed, indehiscent and one-seeded, reniform, subreniform, suborbicular, sometimes obovate or pyriform, never more than 1.5 cm. in diameter, glabrous or nearly so. The wall consists of two distinct layers: an outer fleshy and smooth exocarp which, when fresh, varies from white to pinkish-red, red, dark blue, or almost black, and the crustaceous and more or less prominently scrobiculate or pitted endocarp, this character becoming evident in the dried fruit. The seeds are compressed and are characteristically covered by numerous minute dark-reddish glands, which only Warburg, in Engler & Prantl, Nat. Pflanzenfam. 3(5): 371. 1896, appears to have noticed. The testa or seed-coat is thick. The endosperm, if present at all, is reduced to a very thin layer adhering to the inner seed-coat. The cotyledons are flat, fairly thick, slightly rugose or undulate, straight or incurved; the radicle is inferior, curved, and cylindric.

V. SYSTEMATIC CONSIDERATIONS

The family Sabiaceae was proposed by Blume, Mus. Bot. Lugd.-Bat. 1: 368. 1851, to take the genus *Sabia* Colebrooke (*Meniscosta* Blume), but Planchon, Bentham & Hooker f., Baillon, Warburg, and others have expanded the family so that now four genera are currently recognized: *Sabia, Meliosma, Phoxanthus,* and *Ophiocaryon*. *Phoxanthus* Benth. and *Ophiocaryon* Schomb. are monotypic genera of Brazil and Guiana; *Meliosma* Blume, with between one hundred thirty and one hundred forty described species, is the largest genus, with approximately thirty-five species occurring in Mexico, Central America, the West Indies, and South America, the remaining three-fourths of the proposed species being characteristic of the Indo-Malaysian and Indo-Chinese regions, the Old World generic range being from northern India to Ceylon eastward to Korea and Japan and southward through Malaysia to New Guinea. The remaining genus, *Sabia* Colebrooke, wholly confined to the Indo-Malaysian and Indo-Chinese regions, is the subject of the present detailed study.

In reference to the accepted family name it may be noted that when Endlicher, Gen. Pl. 1074. 1840, proposed the designation Meliosmea as a subgroup of the Sapindaceae to take only the genus *Meliosma* Blume, he did not treat this as

having independent family status. In a brief paper published by Planchon on the affinities of the genus *Ophiocaryon,* Fl. Serr. Jard. Europe **5**: 532c–532d. 533c. 1849, he listed *Llavea* Planch. (= *Meliosma* Blume), *Ophiocaryon* Schomb., and *Sabia* Colebr. (*Meniscosta* Blume) as constituting "un groupe naturel auquel nous conservons le nom de Méliosmées, créé par Endlicher pour le seul genre *Meliosma,* et subordonné par lui au titre plus général de Sapindacées," and stated that its affinities were not with the Sapindaceae. Later, Ann. Sci. Nat. IV. Bot. **3**: 296. 1855, in again discussing the position of *Ophiocaryon,* he states: "On place d'ordinaire les Méliosmées parmi les Sapindacées, ou du moins tout à côté d'elles." After discussing its relationships with various families now placed in the Sapindales and certain genera of the Anacardiaceae, he concludes: "Par ces raisons et par l'analogie de facies, je placerais volontiers les Méliosmées à la suite des Térébinthacées" (Anacardiaceae).

As Planchon's rather casual original treatment antedates Blume's proposal of the Sabiaceae by about two years, there might be a valid argument for replacing the family name Sabiaceae by Planchon's designation, although such action would be objectionable in view of the general acceptance of Blume's family name.

Bentham & Hooker f., Gen. Pl. **1**: 413–415. 1862, accepted the family Sabiaceae, by them interpreted to include four genera, *Sabia, Meliosma, Phoxanthus,* and *Ophiocaryon,* and placed it between the Sapindaceae and the Anacardiaceae. Warburg, in Engler & Prantl, Nat. Pflanzenfam. **3**(5): 367–374. 1895, recognizing the same genera as did Bentham & Hooker f., left the family in the Sapindales between the Sapindaceae and the Melianthaceae. Wettstein, Handb. Syst. Bot. ed. 3. 734. 1924, placed the family in the Terebinthales with and following the Sapindaceae ,and the Hippocastaneaceae, and Hutchinson, Fam. Fl. Pl. Dicot. 254. 1926, suggested no change in position, leaving it in the Sapindales following the Sapindaceae and the Aceraceae.

The genus *Sabia* is most highly developed in the number of species in China, and especially in southwestern China, fairly well represented in northern India, but with only one species in southern India, and poorly represented in other parts of its generic range, such as Japan and Formosa, the Philippines, Siam, Indo-China, the Malay Peninsula, Sumatra, Java, Borneo, the Moluccas, New Guinea, and the Solomon Islands. It is rather strikingly differentiated by the opposition of its floral parts, normally 5 petals opposite the 5 sepals, 5 fertile stamens opposite the 5 petals, by its very characteristic carpidia, and by the in general scandent habit of the rather numerous species. Again, in many of the species various floral parts are provided with minute, obscure, more or less colored glandular dots, while many species are characterized by having few indurated disciform glands on the margins or sides of the disc or on the tips of the disc-lobes. Attention is called to the fact that the obscure glandular-punctate characters of the floral parts of certain species can be detected with certainty only under a reasonably high-powered binocular, rarely with an ordinary hand lens.

Wallich, in Roxb. Fl. Ind. **2**: 308. 1824, suggested that *Sabia* resembled the Terebinthaceae (= Anacardiaceae) because of its general characters and the presence of small colored punctate glands. A year later de Candolle, Prodr. **2**: 89. 1825, merely listed the genus in his treatment of this family as among the allied and insufficiently known genera. Meissner, Pl. Vasc. Gen. **1**: 76, **2**: 55, 1836–1843, retained the genus as an anomalous one in the Anacardiaceae.

When Blume proposed the genus *Meniscosta,* Bijdr. 29. 1825, which he later reduced to *Sabia,* he thought it to be related to the Menispermaceae, from which, however, it differs very radically; Blume was apparently misled by the superficial characters of the carpidia, which in general appearance are suggestive of the fruits of certain menispermaceous genera; the fruits structurally, however, as well as the floral details, clearly show that *Sabia* is remote from the Menispermaceae. Miers, in Lindley, Veg. Kingd. ed. 3. 467a–477b. 1853, thought that the Sabiaceae was intermediate between the Menispermaceae and the Lardizabalaceae. Hooker f. & Thomson, Fl. Ind. **1**: 208. 1855, suggested that it was intermediate between the Schizandraceae and the Menispermaceae. Planchon, however, Fl. Serr. Jard. Europe **5**: 533c. 1849, Ann. Sci. Nat. IV. Bot. **3**: 296. 1855, proposed that it should be placed in the family "Meliosmées" following the Anacardiaceae, and he seems to be the first botanist to suggest what all future investigators have accepted as the proper place of the genus, i.e., in the alliance with *Meliosma* Blume. When Blume in 1851 proposed the family Sabiaceae to take the genus *Sabia* he stated, Mus. Bot. Lugd.-Bat. **1**: 368. 1851: "Genus typum parvi Ordinis inter Menispermaceas et Lardizabalaceas medii exhibens. Auctores alii Terebinthaceis, Sapindaceis alii illud annumeravere, etsi tam habitus, quam maxime fructus fabrica affinitatem cum Menispermaceis indicat." It is perhaps worthy of note that Planchon, Ann. Sci. Nat. IV. Bot. **3**: 296. 1855, noted certain characters that suggest the Myrsinaceae, and in one case at least, a species of *Sabia* was described as a representative of the genus *Myrsine* (see *Sabia limoniacea* Wall. var. *ardisioides* Chen infra, p. 58). Planchon states: "Notons en passant les singulières coïncidences qui se présentent sur divers points de la structure, et même de l'aspect entre les Méliosmées et Myrsinées, particulièrement entre les *Sabia* et les *Embelia.* Même opposition des étamines aux pétales; mêmes ponctuations glanduleuses dans le tissu des fleurs; enfin cette ressemblance de facies que l'oeil saisit sans que la plume puisse le rendre. Ce sont là des traits utiles à signaler, alors même que les diversités si flagrantes dans la structure des fruits s'opposent à tout rapprochement immediat entre les familles en question."

Bentham & Hooker f., Gen. Pl. **1**: 414. 1862, in accepting the Sabiaceae, state regarding *Sabia,* "Sabia genus est singulare, ob bracteas sepala petala stamina et ovarii lobos omnia opposita; a variis auctoribus prope *Menispermaccas* positum est, sed toto coelo differt floribus 5-meris hermaphroditis, ovario vere syncarpo, et ceterum manifeste *Meliosmati* et *Phoxantho* arcte affine est."

Baillon, Hist. Pl. **5**: 393. 1874, limited his subsidiary group II Sabieae to *Sabia* and *Meliosma,* retaining the Sabieae in the Sapindaceae. In the widely used Endlicher system as modified by Engler and Prantl, Warburg, in Engl. & Prantl, Nat. Pflanzenfam. **3**(5): 366–374. 1895, accepted the treatment of Bentham & Hooker f., placing the genus *Sabia* in the Sabiaceae-Sabieae, and *Meliosma, Phoxanthus,* and *Ophiocaryon* in the Sabiaceae-Meliosmeae. He placed the family in the Sapindales between the Sapindaceae and the Meliantha-ceae. In a still more recent treatment, Wettstein, Handb. Syst. Bot. ed. 3. 734. 1924, placed it in the order Terebinthales following the Sapindaceae, Aceraceae, and Hippocastaneaceae, while Hutchinson, Fam. Fl. Pl. Dicot. 254. 1926, leaves it in the Sapindales following the Sapindaceae and the Aceraceae. It is thus clear that modern authors are in approximate agreement as to the place that the Sabiaceae occupies in various arrangements of the families of the flowering plants. The family is, of course, typified by the genus *Sabia* Colebrooke.

VI. DISTRIBUTION

Sabia Colebr. is characteristic of certain tropical and subtropical regions of the Old World, having no representatives in Africa and Madagascar, Australia, Polynesia, and the New World. The greatest development in species occurs in China, from which country thirty-six species and nine varieties are recognized in this revision; within China the largest number of forms is found in the extreme southwest in Yunnan Province, where twenty-one species are now known. In the remaining provinces the number of species in each is much smaller, sometimes only one or two, but the genus is represented in all of the southern and central provinces, the most northern ones in which representatives of the genus occur being Kansu (a single species as yet unnamed), Shensi, and Kiangsu.

In India, excluding Burma, nine species are known, while ten are known from Burma, for Lace & Rodger, List of Trees, Shrubs, Climbers of Burma 43. 1922, record six species from that country, while four are below described as new. Thailand (Siam) has two species, Indo-China two, and the Malay Peninsula two. One species occurs in Japan proper, this being the most northern in the range of the genus, and two in Formosa. In the Malay Archipelago, including the Philippines, the genus is not strongly represented. There are three species and one variety known from Sumatra, one species and one variety from Java, three species and one variety from Borneo, two from the Philippines, and one from the Moluccas, New Guinea, and the Solomon Islands. Most of the species are of rather local occurrence, no single one even approximating the entire range of the genus, which is from the temperate and tropical Himalayan region (one species in Peninsular India) through China to southern Japan and Formosa southward through the Philippines and Malaysia to New Guinea and the Solomon Islands. The two most widely distributed species are *Sabia limoniacea* Wall. and *Sabia parviflora* Wall., the former extending from northern India to Burma, Siam, Malay Peninsula, Sumatra, Yunnan, and including its var. *ardisioides* Chen, to Kwangsi, Kwangtung, Hainan, and Hongkong in China, the latter extending from northern India to Burma, Yunnan, Kweichow, Kwangsi, Indo-China, and Borneo and, including its var. *Harmandiana* (Pierre) Lecomte, to Yunnan, Indo-China, Siam, and Borneo.

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VIII. EXPLANATION OF CITATIONS

The types of the new species herein described, unless otherwise stated, are deposited in the Herbarium of the Arnold Arboretum. The abbreviations adopted in this revision to indicate the herbaria in which the cited specimens are deposited are as follows:

A. Herbarium of the Arnold Arboretum, Harvard University.
B. Herbarium of the Botanical Garden, Buitenzorg, Java.
C. Herbarium of the University of California, Berkeley, California.
E. Herbarium of the Royal Botanic Garden, Edinburgh.
G. Gray Herbarium, Harvard University.
K. Herbarium of the Royal Botanic Gardens, Kew.
L. Herbarium of Lingnan University, Canton, China.
N. Britton Herbarium, New York Botanical Garden, New York.
P. Herbarium of the Bureau of Science, Manila, P. I.
U. United States National Herbarium, Washington, D. C.

IX. TAXONOMY

Sabia Colebrooke, Trans. Linn. Soc. **12**: 355. *t. 14*. 1819; Wall. in Roxb. Fl. Ind. **2**: 308. 1824; Endl. Gen. Pl. 1135. 1840; Blume, Mus. Bot. Lugd.-Bat. **1**: 368. 1851; Benth. Fl. Hongk. 70. 1861; Benth. & Hook. f. Gen. Pl. **1**: 414. 1862; Baill. Hist. Pl. **5**: 345. *f. 342*. 1874; Hook. f. Fl. Brit. Ind. **2**: 1. 1879; Kurz, For. Fl. Brit. Burma. **1**: 300. 1877; Warb. in Engl. & Prantl, Nat. Pflanzenfam. **3**(5): 370. *f. 184. A–H*. 1896; King, Jour. As. Soc. Bengal **65**(2): 454. 1896 (Mater. Fl. Malay. Pen. **2**: 740); Ridley, Fl. Malay Pen. **1**: 513. 1922; Kanj. Kanj. Das & Purk. Fl. Assam **1**: 324. 1937.

Meniscosta Blume, Bijdr. 28. 1825.

Menicosta Dietrich, Synop. Pl. **2**: 923. 1840.

Enantia Falconer, Hook. Jour. Bot. **4**: 75. 1842.

Androglossum Champion ex Benth. Hook. Jour. Bot. Kew Gard. Miscel. **4**: 42. 1852.

Androglossa Dalla Torre et Harms, Gen. Siph. 300. 1901.

Deciduous or evergreen, mostly scandent shrubs or large climbers, sometimes suberect, rarely erect, glabrous or more or less pubescent, but never densely so; branches terete or flexuous, striate, pubescent or glabrous; branchlets with bud-scales at their bases, terete, striate, pubescent or glabrous, unarmed (except *Sabia japonica* Maxim., in which short indurated spine-like structures subtending the young branchlets occur, sometimes also below leafless nodes); bud-scales pubescent or glabrous, ovate, broadly ovate or lanceolate, their margins ciliate or eciliate; leaves simple, alternate, penninerved, petiolate, exstipulate, glabrous or

sparingly pubescent, sometimes with obscure minute colored glandular dots on the lower surface, various in texture, ranging from membranaceous to rather thickly coriaceous, always entire, the margins mostly narrowly cartilagineous and revolute, ciliate or eciliate, sometimes minutely erose, but never toothed, the lateral nerves generally arcuate-anastomosing, the secondary and tertiary veins varying considerably and forming a lax or compact reticulation. Flowers, when solitary, and inflorescences always axillary, the commonest type of inflorescence being a simple or compound few- to many-flowered cyme borne on often slender peduncles of varying lengths, in the axil of the subtending leaf; the flowers are rarely in simple racemes, while in some species the inflorescences are paniculate, the panicles rather short to as long as the leaves, composed of few to many racemosely arranged simple or more or less compound cymes or cymules, occasionally the primary branch (axis of panicle) more or less leafy, and very nearly intermediate in appearance between a true vegetative shoot and the rachis of an inflorescence; flowers for the most part relatively few, occasionally numerous, small, mostly 5-merous, varying in color from green or greenish white to white, yellowish, or varying shades of purple, some of the floral parts (especially the petals) varying from 4 to 6; peduncles and pedicels generally slender, usually elongating and often more or less clavate in fruit, pubescent or glabrous; bracteoles pubescent or glabrous, linear or lanceolate, persistent or caducous, their margins always ciliate; flowers 4–10 mm. in diameter, rarely larger; calyx persistent, small or minute, pubescent or glabrous, sometimes with one or two bracteoles at the base; sepals 5, opposite the petals, equal or rarely distinctly unequal, with or without minute obscure glandular dots, ovate, broadly ovate or subrounded, rarely oblong, usually 1 mm. long, rarely 2–3 mm. long, 1–2 mm. wide, 3–5-nerved, the nerves prominent or obscure, the apex acute, obtuse or rounded, rarely emarginate, the margins ciliate or eciliate; petals opposite the stamens, imbricate, typically 5, rarely 6 or 4, equal or subequal, thin to fairly thick, with or without obscure minute, colored, glandular dots, variable in shape, but mostly lanceolate, ovate, broadly ovate or obovate, sometimes elliptic or oblong, mostly 2–7 mm. long (very rarely longer), 1–5 mm. wide, 3–9-nerved, the nerves prominent or obscure, the apex acute, obtuse or rounded, sometimes acuminate, the margins ciliate or eciliate; stamens typically 5, rarely 6 or 4, opposite the petals, equal or subequal, free, attached at the base of the petals, all fertile; filaments linear or filiform, complanate, subulate or subclavate, often widened below, equal or subequal, 0.5–5 mm. long, rarely longer, glabrous, with or without obscure minute colored glandular dots; anthers ovoid or oblong, 0.5–1 mm. long, introrsely or extrorsely attached; disc cup-shaped, with or without 5 projecting ribs, the margin irregularly or regularly shallowly to deeply lobed, the lobes minute, acute, obtuse or rounded (§ *Odontodiscus*), or tumid, with or without 2–5 projecting ribs, the margin smooth, annular, or at most obscurely crenate or wavy, and not distinctly toothed (§ *Pachydiscus*); indurated glands (sometimes absent) generally 2–5, minute to small, disciform or irregularly disciform, prominent or obscure, inserted on the disc-lobes, either at the tips or on the sides, sometimes on the sides of the disc or on the projecting ribs; ovary superior, ovoid or subconical, rarely pyramidal, glabrous or pubescent, with or without minute obscure colored glandular dots, the stigmas terminal, minute, rounded or capitate, the styles always more or less persistent and attached basally to the adaxial side of the mature carpel; fruit often with one of the carpels aborted, the carpidium drupaceous, compressed, indehiscent, one-seeded, reniform, subreniform, or suborbicular, rarely obovate or pyriform, never more than 1.5 cm. in diameter (usually smaller), with or without persistent petals at the base; exocarp fleshy and smooth, when fresh white to reddish or dark blue, occasionally black, the endocarp crustaceous and more or less prominently scrobiculate or pitted, this character very evident in the dried fruits; seeds characteristi-

cally covered by numerous minute dark reddish glands; testa thick; endosperm, if present, reduced to a very thin layer adhering to the inner seed-coat or wanting; cotyledons flat, fairly thick, rugose or undulate, straight or incurved; radicle inferior, curved, cylindric.

Species fifty-three, all confined to the Indo-Malaysian and Chinese regions, extending from the northwestern Himalayan region to southern Japan, and southward through Malaysia to New Guinea and the Solomon Islands. In addition to the fifty-three species and eleven varieties recognized in this paper, I have seen incomplete or imperfect material representing about a half-dozen species additional to those herein named and characterized. I have not attempted to name or characterize these, for I am convinced that it would be unwise to do so until more complete material is secured. This applies particularly to certain Chinese deciduous species of which branches and flowers only are at present available.

In his very brief consideration of certain generic characters, Lecomte [1] suggested placing all species with solitary flowers, "pedicelles uniflores," at least those with the pedicels much thickened upward in fruit, in one section (*S. leptandra* Hook. f. & Th., *S. campanulata* Wall., *S. japonica* Maxim., and *S. Schumanniana* Diels). A second suggested section was one to take the species with many-flowered inflorescences, "pedicelles toujours multiflores," the pedicels not much thickened upward in fruit, in which he places his species *S. emarginata* Lec. He proposed no names for these suggested subdivisions of the genus, and only casually mentioned various other described species. He apparently did not make a critical comparative study of all the known species, for he was concerned chiefly with the characterization of his proposed new *Sabia emarginata* Lec. and made no comprehensive review of all the then known species.

Stapf's preliminary study of the genus and his provisional manuscript key, which was unfortunately translated into Japanese and published with no supporting data, is mentioned above. In this key, which I judge Stapf never intended to publish in its original form, he suggested, but did not define, a section *Eusabia* in which he included *S. limoniacea* Wall., *S. parviflora* Wall., *S. subcorymbosa* Stapf, *S. Dielsii* H. Lév., *S. gracilis* Hemsl., and *S. Swinhoei* Hemsl., set off by the first entry in his key: "Flowers widely open, more or less rotate, small; style short, several times shorter than the mature fruit."

The second contrasting primary key division is: "Flowers more or less bell-shaped with the petals broad and conniving; styles long (3 + mm.), growing out during maturation, at length only slightly shorter than the mature fruit." This group, which Stapf did not name, was designated as *Dolicostylae* by the anonymous Japanese author, who translated and published Stapf's provisional key in Japanese,[2] but here again, no technical definition was published. The species included by Stapf were *S. fasciculata* Lec., *S. emarginata* Lec., *S. rotundata* Stapf, *S. discolor* Dunn, *S. coriacea* Rehd. & Wils., *S. yunnanensis* Fr., *S. latifolia* Rehd. & Wils., *S. omeiensis* Stapf, *S. Schumanniana* Diels, *S. acutisepala* Stapf, *S. puberula* Rehd. & Wils., *S. pallida* Stapf, and *S. olacifolia* Stapf.

The third group set off by Stapf, but unnamed, was characterized in his key as: "Flowers solitary, pedicels markedly thickened upwards," and this was named, but not technically characterized, by the Japanese author above referred to, as *Leptandreae*. It included *Sabia gaultherifolia* Stapf, *S. sinensis* Stapf, *S. japonica* Max., *S. Ritchiei* Rehd. & Wils., and *S. spinosa* Stapf.

[1] Bull. Soc. Bot. France **54**: 672–673. 1907.
[2] Acta Phytotax. Geobot. **5**: 76. 1936.

While I have realized that a more or less artificial key could be constructed on the basis of characters suggested by Lecomte and by Stapf, I have considered it expedient to stress the disc characters that I have noted during the course of this study, and have hence divided the species into two groups on the basis of disc characters, for these characters are more or less evident in both flowering and fruiting specimens. As secondary divisions of my key I have utilized various other vegetative, inflorescence, floral, and fruit characters. I realize that my proposed arrangement can be considered only as tentative, for it will be subject to modifications as more abundant material becomes available in the future. I judge, however, that the arrangement I have suggested brings into association manifestly allied species at least as well as any other scheme that has been proposed. The two sections into which I have divided the genus are defined below:

Sectio **Pachydiscus**: Disco valde prominenti, tumido, saepe incrassato vel aucto, plerumque indurato, raro brevi-cylindrico, marginibus integris vel subundulatis obscureque crenatis, nequaquam conspicue dentatis vel lobatis.

Sectio **Odontodiscus**: Disco plus minusve cyathiformi, haud conspicue tumido vel inflato, plerumque vix incrassato, marginibus irregularibus vel regulariter plus minusve profunde dentatis vel lobatis, nequaquam annulatis integrisque vel subintegris.

KEY TO THE SPECIES AND VARIETIES

A. Disc very prominent, turgid or swollen, rarely short-cylindric, usually thickened, its margins annular or undulate, rarely slightly crenate, never distinctly toothed or lobed. Sect. PACHYDISCUS.

B. Sepals relatively large, thin, mostly about 2 mm. long and 1 mm. or more wide.

C. Sepals equal, entire; petals elliptic or slightly obovate-elliptic, about 5 × 2.5 mm. (Formosa) .....1. *S. transarisanensis.*

C. Sepals very unequal, the larger ones irregularly emarginate; petals orbicular-obovate, about 4 mm. long and wide (Hupeh) .....2. *S. emarginata.*

B. Sepals always small, 1 mm. long or less.

C. Flowers coetaneous with the young leaves.

D. Leaves conspicuously pubescent on both surfaces (Yunnan) .....3. *S. pubescens.*

D. Leaves glabrous or only sparingly pubescent.

E. Disc longitudinally 3–5-ribbed, each rib with a small indurated gland at about the middle (Yunnan) .....4. *S. Rockii.*

E. Disc not ribbed and without indurated glands (Hupeh) .....5. *S. Ritchieae.*

C. Flowers appearing after the leaves are fully developed.

D. Ovaries more or less pubescent.

E. Each projecting rib of the disc bearing a small, obscure or prominent, disciform indurated gland at about the middle.

F. Styles more or less pubescent.

G. Peduncles and pedicels pubescent or puberulent (Hupeh, Szechuan). 6. *S. puberula.*

G. Peduncles and pedicels glabrous (Hupeh)..6a. *S. puberula* var. *hupehensis.*

F. Styles glabrous (Yunnan, Szechuan) .....7. *S. yunnanensis.*

E. Projecting ribs of the disc without indurated glands (Szechuan)..8. *S. latifolia.*

D. Ovaries glabrous.

E. Disc with 3–5 more or less distinct longitudinal ribs.

F. Disc without indurated disciform glands.

G. Leaf-bases broadly truncate-rounded or truncate-subcordate; flowers in few-flowered peduncled cymes (Yunnan) .....9. *S. Yuii.*

G. Leaf-bases acute to somewhat rounded, never truncate-rounded or truncate-subcordate; flowers in short racemes or solitary.

H. Flowers apparently solitary (unknown); sepals broadly rounded or obtuse; disc much thickened and indurated (Chekiang, Fukien, Kiangsi, Hupeh) .....10. *S. gaultheriifolia.*

H. Flowers in short racemes, usually each flower subtended by a small deciduous leaf; sepals acute; disc shortly cylindric, not much thickened or indurated (Yunnan) .....11. *S. Metcalfiana.*

F. Disc with several distinct more or less disciform indurated glands either on the sides or on the margins.
G. Indurated glands near the margin of the disc (Yunnan) ...12. *S. pentadenia.*
G. Indurated glands at about the middle of the disc.
H. Sepals and the basal or median part of the petals minutely reddish-glandular-punctate (Yunnan) .....13. *S. Croizatiana.*
H. Sepals and petals epunctate.
I. Cymes much shorter than the leaves.
J. Petioles mostly about 1 cm. long (Szechuan) .....14. *S. omeiensis.*
J. Petioles mostly about 5 mm. long (Yunnan).
7a. *S. yunnanensis* var. *Mairei.*
I. Cymes nearly or quite as long as the leaves, on long slender peduncles.
J. Cymes 3–4-flowered (Szechuan, Yunnan) .....15. *S. Schumanniana.*
J. Cymes 6–20-flowered.
K. Cymes 4–6 cm. long (Hupeh).
15a. *S. Schumanniana* var. *pluriflora.*
K. Cymes 8–13 cm. long (Szechuan).
15b. *S. Schumanniana* var. *longipes.*
E. Disc smooth, without longitudinal ribs.
F. Disc with five indurated disciform glands.
G. Glands equatorial.
H. Leaves up to 9 × 3.5 cm. (Yunnan) .....16. *S. glandulosa.*
H. Leaves at most 6 × 2 cm. (Yunnan) .....17. *S. angustifolia.*
G. Glands basal; leaves up to 11 × 4 cm. (Shensi) .....18. *S. shensiensis.*
G. Glands marginal; leaves up to 7 × 2.5 cm.
H. Leaves membranaceous, pale and subglaucous beneath, up to 5 × 1.5 cm. (Yunnan) .....19. *S. bicolor.*
H. Leaves chartaceous, up to 7 × 2.5 cm., subconcolorous, but if paler beneath never subglaucous (Yunnan) .....20. *S. callosa.*
F. Disc without indurated disciform glands (Yunnan) .....21. *S. pallida.*
A. Disc more or less shallowly cup-shaped, not conspicuously turgid or swollen and not much thickened, its margin irregularly or regularly shallowly to deeply toothed or lobed, never annular and entire .....Sect. Odontodiscus.
B. Older branches with few to many thickened, short, indurated, spine-like structures subtending the branchlets and sometimes the leaves or flowers, the flowers precocious, appearing before the leaves.
C. Ovaries pubescent (Japan, Kiangsu, Anhwei, Chekiang, Fukien, Kwangtung, Kwangsi, Hunan, Kiangsi) .....22. *S. japonica.*
C. Ovaries glabrous (Kwangtung, Kiangsi) .....22a. *S. japonica* var. *sinensis.*
B. Plants wholly unarmed, deciduous and with coetaneous leaves and flowers, or evergreen.
C. Flowers in simple, axillary, solitary or fascicled racemes, never in cymules (Borneo).
23. *S. racemosa.*
C. Flowers variously arranged, but never in simple racemes.
D. Flowers axillary, solitary, or sometimes two or more together, but never in simple or compound cymes or cymules, or in compound inflorescences.
E. Petals 10–12 mm. long, green (Nepal) .....24. *S. campanulata.*
E. Petals smaller, never exceeding 8 mm. in length, green to purple.
F. Evergreen; petals oblong to oblong-lanceolate (Malay Peninsula, Sumatra).
25. *S. sumatrana.*
F. Deciduous.
G. Flowers greenish purple or green; petals more or less narrowed upward; filaments up to 5 mm. long, not widened below; styles 4–5 mm. long (Sikkim, Bhotan) .....26. *S. leptandra.*
G. Flowers purple; petals broadly obovate and broadly rounded; filaments 3–4 mm. long, widened below; styles 2.5–3 mm. long (Kashmir to Sikkim and Nepal) .....24. *S. campanulata.*
D. Flowers in few- to many-flowered cymes, the cymes strictly simple, solitary, or the cymules arranged in compound inflorescences.
E. Sepals very unequal, thin.
F. Flowers small, crowded in small 8–10-flowered cymes about 1 cm. in diameter; stamens 0.5–1 mm. long; leaves up to 6 cm. long (Yunnan) ..27. *S. dumicola.*

F. Flowers larger; cymes 2-flowered; stamens 3–4 mm. long; leaves up to 9 cm. long (Hunan) .....28. *S. heterosepala.*

E. Sepals equal.

F. Flowers relatively large, longer; stamens 4–6 mm. and styles 4–5 mm. long; inflorescences branched from base, cymose-paniculate; leaves coriaceous to subcoriaceous; evergreen (Burma, Tonkin, Yunnan, Kwangsi, Kwangtung). 29. *S. fasciculata.*

F. Flowers mostly small; stamens and styles short, never more than 2.5 mm. long, often 1 mm. or less.

G. Flowers in small, solitary, few-flowered, simple cymes or umbels.

H. Leaves conspicuously pubescent beneath; petals always gradually and rather strongly narrowed upward.

I. Leaves mostly less than 1.5 cm. wide (Kweichow, Szechuan). 30. *S. gracilis.*

I. Leaves 2–5 cm. wide.

J. Leaf-bases mostly acute (Formosa, Chekiang, Fukien, Kwangtung, Hupeh, Hunan, Kwangsi, Kweichow, Kiangsi) .....31. *S. Swinhoei.*

J. Leaf-bases rounded.

K. Inflorescences and calyces pubescent (Hupeh, Chekiang, Kwangsi). 31a. *S. Swinhoei* var. *subcorymbosa.*

K. Inflorescences and calyces glabrous (Hainan). 31b. *S. Swinhoei* var. *hainanensis.*

H. Leaves glabrous beneath; petals various.

I. Leaves glaucous beneath in strong contrast to the dark-colored upper surface (Chekiang, Fukien, Kwangtung, Kiangsi) .....32. *S. discolor.*

I. Leaves sometimes pale beneath but never glaucous, lower and upper surfaces mostly subconcolorous.

J. Leaves coriaceous, rather rigid (Fukien, Kwangtung). 33. *S. coriacea.*

J. Leaves membranaceous to chartaceous, not rigid.

K. Deciduous; petals triangular-ovate, much narrowed upward to the obtuse tip (Himalayan region) .....34. *S. purpurea.*

K. Evergreen; petals (as far as known) not strongly narrowed upward, oblong, elliptic or obovate, broadly rounded to obtuse.

L. Leaves conspicuously falcate-acuminate (Burma)..35. *S. falcata.*

L. Leaves acute to acuminate, the acumen usually straight, not falcate.

M. Cymes in the axils of greatly reduced leaves and arranged on an elongated leafy branchlet from the axils of normal leaves, these flower-bearing and leafy branchlets longer than the normal leaves (Southern India) .....36. *S. malabarica.*

M. Cymes in the axils of normal leaves.

N. Leaves 3–8 cm. long.

O. Petals usually persisting at the base of the distinctly scrobiculate carpidia; leaves 4.5 cm. long or less (Yunnan). 37. *S. parvifolia.*

O. Petals not persisting at the base of the scrobiculate or non-scrobiculate carpidia.

P. Carpidia non-scrobiculate; leaves acute to obtuse at the base, distinctly reticulate beneath (Yunnan). 38. *S. acuminata.*

P. Carpidia prominently scrobiculate; leaves mostly broadly rounded at the base, very obscurely reticulate beneath.

Q. Pedicels at most 5 mm. long (Kweichow, Kwangsi). 39. *S. brevipetiolata.*

Q. Pedicels 10–15 mm. long (Kwangsi) ...40. *S. Wangii.*

N. Leaves up to 12–14 cm. long, varying from 6 to 14 cm. in length.

O. Leaves lanceolate; the scrobiculate carpidia at maturity more or less brown-pustular (Kweichow, Yunnan). 41. *S. Diclsii.*

O. Leaves elliptic-ovate to ovate-lanceolate; the scrobiculate carpidia never brown-pustular (Yunnan, Tonkin).
42. *S. olacifolia.*

G. Flowers in more or less compound inflorescences, the cymules mostly few-flowered, variously arranged in small to large inflorescences.

H. Branchlets densely tomentose; leaves more or less tomentose or pubescent beneath, at least on the midrib and nerves.

I. Disc lobes tipped by small indurated glands; pedicels and branchlets of the inflorescence glabrous; petals small (ex Hooker f. less than 1 mm. long) (India, and probably from Assam) .....43. *S. tomentosa.*

I. Disc-lobes without indurated glands; pedicels and branchlets of the inflorescence pubescent; petals about 3 mm. long (Upper Burma).
44. *S. Wardii.*

H. Branchlets glabrous or only sparingly pubescent; leaves glabrous on both surfaces.

I. Petals 3.5–5 mm. long, these and the sepals, filaments, and ovaries minutely reddish-punctate; carpidia up to 1.2 cm. long, pyriform, much narrowed below, very obscurely scrobiculate (Bengal, Silhet, Assam, Manipur) .....45. *S. lanceolata.*

I. Petals mostly 2–3 mm. long, the floral parts not reddish-punctate, or if so the punctations obscure; carpidia obovate, obovate-reniform, or orbicular, never pyriform, mostly prominently scrobiculate.

J. Flowers usually numerous or very numerous, the cymules racemosely arranged in relatively narrow racemiform-paniculate or paniculate inflorescences, the inflorescences often as long as the leaves.

K. Lateral cymes of the inflorescences always compound (Northern India to Upper Burma) .....46. *S. paniculata.*

K. Lateral cymes of the inflorescences always simple.

L. Stamens distinctly unequal; petals 1.5–2 mm. long; inflorescences often with small scattered leaves; normal leaves coriaceous.

M. Inflorescences glabrous (Northern India, Burma, Siam, Malay Peninsula, Sumatra, Yunnan) .....47. *S. limoniacea.*

M. Inflorescences sparingly pubescent (Fukien, Kwangtung, Hainan, Kwangsi) .....47a. *S. limoniacea* var. *ardisioides.*

L. Stamens equal; petals 2.5–3 mm. long; inflorescences never leafy; leaves chartaceous.

M. Inflorescences pubescent (Sumatra, Java, Borneo).
48. *S. javanica.*

M. Inflorescences glabrous (Sumatra, Java).
48a. *S. javanica* var. *glabriuscula.*

J. Flowers relatively few, in solitary compound or subdecompound axillary cymes, or if the cymules are racemosely arranged, then both cymules and flowers very few in number and the uppermost flowers in the inflorescence often racemose, the inflorescences usually much shorter than the leaves.

K. Cymules few and few-flowered, arranged in rather short narrow racemiform panicles, or the uppermost flowers actually racemose.

L. Sepals and pedicels sparingly but distinctly pubescent; stamens 1.5–1.8 mm. long (Moluccas, New Guinea, Solomon Islands).
49. *S. pauciflora.*

L. Sepals pubescent only on their margins; pedicels glabrous; stamens 0.5–1 mm. long (Philippines) .....50. *S. reticulata.*

K. Flowers in open, lax, compound or decompound, axillary, solitary, peduncled cymes, the cymes or cymules never arranged in panicles.

L. Petals 3.5–4 mm. long; disc-lobes terminated by indurated glands; leaves shining on both surfaces (Upper Burma).
51. *S. kachinica.*

L. Petals mostly 2–3 mm. long; disc-lobes without indurated glands; leaves dull or only slightly shining.

M. Styles well developed, at least 0.5 mm. long; filaments mostly 1.5–2 mm. long.

N. Inflorescences glabrous.
O. Leaves with 5–7 or rarely 8 pairs of lateral nerves, mostly less than 10 cm. long (Himalayan region, Yunnan, Kweichow, Kwangsi, Indo-China, Borneo) ....52. *S. parviflora.*
O. Leaves with 8–10 pairs of lateral nerves, mostly 12–18 cm. long (Siam, Burma, Yunnan, Kweichow).
52a. *S. parviflora* var. *nitidissima.*
N. Inflorescences sparingly pubescent (Yunnan, Indo-China, Siam, Borneo) .....52b. *S. parviflora* var. *Harmandiana.*
M. Styles almost wholly lacking, or, if evident at all, not more than 0.2 mm. long; filaments 1–1.5 mm. long (Philippines).
53. *S. philippinensis.*

Sect. PACHYDISCUS (p. 15)

1. **Sabia transarisanensis** Hayata, Ic. Pl. Form. **5**: 31. *t. 5.* 1915; Sasaki, List Pl. Form. 278. 1928; Makino & Nemoto, Nippon-Shokubutsu-Sôran (Fl. Jap.) ed. 2. 704. 1931; Nemoto, Nippon-Shokubutsu-Sôran-Hoi (Fl. Jap. Suppl.) 459. 1936.

"Frutex scandentissimus plus minus volubilis; rami teretes in vivo virides, medulla solida, cortice laevi haud vel tenuissime lenticellato elevato-ruguloso glaberrimo, cicatricibus foliorum elevatis semi-rotundatis, 1½ mm. latis, ramuli gracillimi hornotini foliati basi perulis triangularibus subrotundatis 1 mm. longis ciliatis 2–3-seriatim dispositis et cataphyllis binis obovato-spatulatis 8 mm. longis suffultis. Folia membranacea alterna ovato-oblonga vel oblonga 4 cm.–6 cm. longa 18 mm.–30 mm. lata apice acuta vel breve acuminata ad summum obtusa basi obtusa vel acuta margine tenuiter cartilagineo-marginata obscure denticulata, denticulis minutis apice ciliolatis, membranacea supra in vivo pallido-viridia subtus pallidissimo-cinerea, nervis venis venulis rubro-coloratis subtus distincte reticulatis tenuissimis, utraque pagine glabra, costis venisque utraque pagine haud vel vix elevatis subplanis, costa flexuosa haud recta, venis lateralibus primariis utroque latere costae 5–6 arcuatis, mediis basi angulo 50° a costa egressis, venulis grosse reticulatis, petiolis 4–6 mm. longis rubescentibus, stipulis nullis. Flores ad axillas foliorum ramulorum hortoniorum [hornotinorum] solitarii vel gemini longe pedicellati, pedunculis ad axillas semper solitariis ebracteatis gracilibus glaberrimis 1 cm. longis vel apice furcatim 1-plo ramosis, ramis vel pedicellis pedunculo brevioribus a se angulo 90° egressis 5–6 mm. longis, vel pedunculis simplicibus haud ramosis florem singulum gerentibus. Sepala 5 viridia subaequalia oblonga 2 cm. [mm.] longa 1–1½ mm. lata apice obtusissima basi vix vel haud contracta paralleliter multi-nervia glaberrima. Petala 5–6 subpatentia fusco-purpurascentia oblongo-quadrangularia 5 mm. longa 2½ mm. lata apice rotundata basi haud contracta ad insertionem 2 mm. lata glabra sub-5-nervia margine integra. Stamina 5–6 petalo breviora glabra, filamentis 2½ mm. longis leviter dorso complanatis subteretibus, antheris rotundatis minus quam 1 mm. latis longisque utrinque emarginatis 2-locularibus, loculis valvis singulis dehiscentibus. Discus pulviniformis sub ovario situs leviter 5-lobatus ⅓ mm. altus. Ovarium globoso-conicum ½ mm. longum totiusque latum glabrum laeve 2-loculare, loculis 2-ovulatis, apice ad stylum abeuns, stylo validiusculo basi cum ovariis aequilato 3½ mm. longo columniformi glabro apice punctiformi stigmatoso, stigmate punctiformi minuto.

HAB. M. Arisan Tozan, leg. B. HAYATA et TAKEO ITO, Aprili. 1914.

Very distinct for its small thin leaves not exceeding 5 cm. in length."

A sterile specimen, *Wilson 10936* (A), from near the type locality, Arisan to Mount Morrison, altitude 2833–3333 m., probably represents this species, but its leaves are 4–9 cm. long and 2–3.5 cm. wide; *Wilson 10035* (A) from Nanto to Noko via Musha, also named *Sabia transarisanensis* Hayata, is also sterile, consisting only of leafless branches. I am unable to add anything to the original description and have seen no flowers or fruit of this species.

2. **Sabia emarginata** Lecomte, Bull. Soc. Bot. France **54**: 673. 1907; Rehd. & Wils. in Sargent, Pl. Wils. **2**: 196. 1914; Hand.-Maz. Symb. Sin. **7**: 644. 1933.

A deciduous suberect shrub, the branches and branchlets yellowish green (at least when young), slender, terete, striate, glabrous; bud-scales glabrous, ovate, the margins eciliate; leaves (very immature) oblong-lanceolate to oblong-elliptic, 2–3 cm. long, 1–1.5 cm. wide, acute at apex, acute to obtuse at base, membranaceous, glabrous and olivaceous on both surfaces, the margins not ciliate; nerves 5 pairs, slender, curved-ascending, arched and joined by means of the secondary nerves, slender, distinct, elevated on the lower surface, the reticulations somewhat obscure; petioles 2–3 mm. long, glabrous; inflorescences axillary, solitary, 1–1.5 cm. long, glabrous, mostly 2-flowered, sometimes 1-flowered, the peduncles somewhat glaucous, 1 cm. long; pedicels 2–4 mm. long; bracteoles caducous; flowers maroon, 6–8 mm. in diameter; calyx unequally 5-lobed, glabrous, the lobes thin, irregular, subobovate to oblong, 1.7–2 mm. long, 1–2 mm. wide, some of them distinctly emarginate, others rounded, the margins eciliate; petals 5, equal, thin, suborbicular-obovate, 3–4 mm. long and wide, 3–5-nerved, broadly rounded, the margins eciliate; stamens 5, equal; filaments slender, 2 mm. long, glabrous; anthers oblong, 0.8 mm. long, introrse; disc tumid, with 2 or 3 obscure projecting ribs, each rib bearing a very minute obscure indurated gland on its edge, the margin slightly undulate; ovary subconical or ovoid, glabrous; styles 4 mm. long, glabrous; stigmas minute, rounded; carpidia unknown.

China: Hupeh, south of Patung, *A. Henry 5314* (photo of type N, isotype G, N), March, flowers maroon.

Distribution: China (Hupeh).

This species is characterized by its thin, relatively large but very irregular subovate to oblong calyx-lobes, some of which are distinctly emarginate at their apices, other rounded. The type material is very inadequate, the leaves being very immature. Lecomte's description of the anthers as "ovatis, magnis (5–6 mm.)" is a palpable error; certainly 0.5–0.6 mm. was intended.

Rehder and Wilson, in Sargent, Pl. Wils. **2**: 196. 1914, referred *Wilson 1728* from Kuling, Kiangsi, to this species with some doubt; its branches and branchlets are dark brownish purple, not pale greenish as in the type. It is a fruiting specimen and is hence not directly comparable with Lecomte's type. While the structure of the disc suggests *Sabia emarginata* Lecomte, the sepals are unfortunately fallen. It may or may not belong here. Its characters are not included in the description given above.

3. **Sabia pubescens** sp. nov.

Frutex scandens, deciduus, ramis pallide viridibus, teretibus, striatis, glabris; ramulis viridibus vel pallide brunneis, teretibus, gracilibus, striatis, sparse pubescentibus; perulis glabris, ovatis, margine ciliatis; foliis valde immaturis oblongo-lanceolatis, 1.5–3 cm. longis, 0.5–1 cm. latis, breviter acuminatis, basi obtusis, membranaceis, utrinque praesertim ad costam nervosque distincte pubescentibus; nervis 5 utrinque, subadscendentibus, curvatis, arcuato-anastomosantibus, subtus leviter elevatis, supra obscuris, venulis laxe reticulatis; petiolo pubescente, 5–8 mm. longo; inflorescentiis cymosis, 1.5 cm. longis, pubescentibus, 2–3-floris; pedunculis pubescentibus, circiter 8 mm. longis; pedicellis gracilibus, 3 mm. longis; bracteolis puberulis, linearibus, 2 mm. longis; floribus 10 mm. diametro; calycibus glabris, lobis aequalibus, ovatis, 1 mm. longis, acutis vel obtusis, margine minute erosulis, eciliatis; petalis 5, aequalibus, obovatis, 5 mm. longis, 3 mm. latis, late rotundatis, 5–6-nerviis, obtusis, margine eciliatis; staminibus 5, inaequalibus; filamentis complanatis, gracilibus, 3–5 mm. longis, glabris; antheris oblongis, 1 mm. longis, extrorsis; disco tumido, costulato, costulis 3,

prominentibus, singulem glandulam minutissimam obscuram induratam in partibus medianis gerentibus, margine undulatis; ovario ovoideo, sparse puberulo vel glabro; stylis 3–4 mm. longis, glabris; stigmatibus minutis, rotundatis; carpidiis ignotis.

CHINA: Yunnan, without locality, *T. T. Yü 5231*, TYPE (A), in 1938, without notes.
DISTRIBUTION: China (Yunnan).

This species is characterized by its pubescence, its 2- or 3-flowered short cymes, and its 3-ribbed tumid disc, each rib being supplied with a very obscure and minute indurated gland about halfway up.

4. **Sabia Rockii** sp. nov.

Frutex deciduus, suberectus vel scandens, 2–3 mm. altus, ramis purpureo-brunneis vel olivaceo-brunneis, teretibus, lenticellatis, glabris; ramulis pallide viridibus vel brunneis, gracilibus, obscure striatis, glabris; perulis glabris, late ovatis, acutis, margine ciliatis; foliis novellis lanceolatis, 3–3.5 cm. longis, 1 cm. latis, acutis, basi late acutis vel rotundatis, membranaceis, supra sparse minute pubescentibus, subtus glabris, margine scariosis, brevissime ciliatis; nervis 5 utrinque, gracilibus, curvato-adscendentibus, arcuato-anastomosantibus, utrinque cum venulis laxe reticulatis sat distinctis; petiolo 3 mm. longo, pubescente; inflorescentiis cymosis, 1.5 cm. longis, glabris, 2- vel 3-floris; pedunculis 3–5 mm. longis, gracilibus; pedicellis 5–7 mm. longis, gracilibus; bracteolis caducis; floribus 10 mm. diametro, purpureo-viridibus; calycibus glabris, lobis 5, aequalibus, subrotundatis vel late ovatis, 0.5 mm. longis, margine eciliatis; petalis 5, aequalibus, suborbicularibus vel late obovatis, latissime rotundatis, 5 mm. longis, 3–4 mm. latis, 7–9-nerviis, margine eciliatis; staminibus 5, inaequalibus; filamentis complanatis linearibus, 2–4 mm. longis, glabris; antheris oblongis, 1 mm. longis, extrorsis; disco tumido, costulato, costulis 3–4 prominentibus, margine undulato vel crenato, glandulis induratis nullis; ovario ovoideo vel subconico, glabro; stylis 4 mm. longis, glabris; stigmatibus minutis, rotundatis; carpidiis ignotis.

CHINA: Yunnan, eastern slopes of the Likiang Snow Range, Yangtze watershed, *J. F. Rock 8334*, TYPE (A, C, U), alt. 2700–3000 m., flowers purplish green, 1923–24; Tchehai, *E. E. Maire 357* (A), alt. 2550 m., flowers dull violet; Tchou-tsin, *E. E. Maire 3320* (C), alt. 3000 m., flowers greenish.
DISTRIBUTION: China (Yunnan).

This species seems to be similar to *Sabia Croizatiana* Chen, but it may be distinguished by its shorter peduncles and its ribbed tumid disc, which is without indurated glands. The flowers appear with the young leaves. *Maire 357* and *3320* represent a younger stage than the type collection.

5. **Sabia Ritchieae** Rehd. & Wils. in Sargent, Pl. Wils. **2**: 195. 1914, Jour. Arn. Arb. **9**: 91. 1928.

A deciduous scandent shrub, 2 m. high, the branches brown, stout, terete, flexuous, obscurely striate, lenticellate, glabrous, the branchlets greenish yellow, slender, terete, somewhat shiny; bud-scales glabrous, ovate, acute, the margins ciliate; very young parts sparsely pubescent, soon becoming glabrous; leaves elliptic-ovate or oblong-elliptic, 6–9 cm. long, 2–4 cm. wide, acuminate, broadly cuneate at base, subcoriaceous (immature ones membranaceous), somewhat glaucous, glabrous on both surfaces or sparsely pubescent along the midrib on the upper surface when young, dull on the upper surface, pale greenish yellow beneath, the margins very narrowly revolute, eciliate, or very shortly ciliate when young; nerves 3–5 pairs, arcuate-anastomosing, elevated, the veinlets loosely reticulate, conspicuous on the lower surface, obscure above; petioles of mature leaves 1.5 cm. long, glabrous, those of the young leaves 4–5 mm. long, minutely pubescent; inflorescences axillary, solitary, about 1–1.5 cm. long, 1-flowered;

peduncles at anthesis puberulent, 1–1.5 cm. long, in fruit clavate, glabrous, 2.5 cm. long; bracteoles none; flowers about 10 mm. in diameter; calyx equally 5-lobed, glabrous, the lobes semiorbicular, 1 mm. long, obtuse, the margins eciliate; petals 5, equal, thin, obovate, broadly rounded, 5 mm. long, 2.5–3.5 mm. wide, 5–7-nerved, the nerves slender and obscure, the margins eciliate; stamens 5, subequal; filaments complanate, 1–2 mm. long, glabrous; anthers oblong, 1 mm. long; disc somewhat tumid, without projecting ribs, the margin annular or undulate, the indurated glands none; ovary conical or ovoid, glabrous; styles 3–4 mm. long, glabrous; stigmas minute, rounded; carpidia suborbicular, 8 mm. in diameter, glabrous, distinctly scrobiculate, without persistent petals at base.

CHINA: Western Hupeh, Hsing-shan Hsien, *E. H. Wilson 2533*, TYPE (A), May, 1907, alt. 900–1200 m., *2533* (in part), isotype (U); without locality, *A. Henry 6780* (G, N).

DISTRIBUTION: China (Hupeh).

I judge that *Henry 6780*, a fruiting specimen, belongs here, and the description as above given is in part based on this collection. The type is a flowering specimen with immature leaves. Rehder & Wilson, Jour. Arnold Arb. **9**: 91. 1928, credit this species to Kansu on the basis of *Rock 12074*. This is a flowering specimen, the flowers appearing with the very young leaves. The petals are larger (6×5.5 mm.), the stamens much longer (5 mm.), while the disc is distinctly different. I am convinced that this and *Rock 24267* from Yunnan, in the same stage of development, represent an undescribed species, but it is inadvisable to characterize it until specimens with mature leaves are received.

6. **Sabia puberula** Rehd. & Wils. in Sargent, Pl. Wils. **2**: 197. 1914.

Apparently an evergreen scandent shrub, 0.5–2 m. high, the branches pale olivaceous to brown, terete, slender, striate, glabrous; branchlets pale olivaceous, terete, slender, obscurely striate, sparsely pubescent, becoming glabrous; bud-scales glabrous, ovate, acuminate, the margins ciliate; leaves oblong-lanceolate, ovate-oblong, or elliptic-oblong, 5–10 cm. long, 1.5–4 cm. wide, acuminate, acute to rounded at base, membranaceous when young, becoming chartaceous, glabrous on both surfaces except the midrib on the upper surface (which is obscurely pubescent in young leaves), dull green to olivaceous on the upper surface, paler beneath, the margins scarious or narrowly and thinly cartilagineous, finely erose, glabrous except when very young; nerves 4 or 5 pairs, slender, curved-ascending, arcuate-anastomosing, more or less elevated beneath, the veinlets loosely reticulate, prominent on the lower surface, somewhat obscure above; petioles 4–10 mm. long, slightly pubescent, becoming glabrous; inflorescences cymose, 3.5–4 cm. long, sparingly pubescent, 2–5-flowered; peduncles slender, 1–2.5 cm. long; pedicels somewhat filiform, 8 mm. long; bracteoles glabrous, lanceolate, 1 mm. long; flowers about 6–8 mm. in diameter; calyx equally 5-lobed, glabrous, the lobes broadly ovate or suborbicular, 1 mm. long, obtuse, the margins ciliate; petals 5, equal, thin, minutely and obscurely reddish-glandular, ovate-elliptic, broadly rounded, 3–4 mm. long, 2–3 mm. wide, 5-nerved, the nerves rather prominent, the margins ciliate; stamens 5, equal; filaments subulate, 4 mm. long, glabrous; anthers ovoid, 0.5 mm. long, extrorse; disc tumid with 3 or 4 projecting ribs, each rib bearing a minute inconspicuous indurated gland at about the middle, the margin annular; ovary minutely pubescent, the styles exserted, 3 mm. long, sparingly pubescent; stigma minute, rounded; carpidia reddish brown, suborbicular, 7 mm. in diameter, glabrous, distinctly scrobiculate, without persistent petals at base.

CHINA: Western Hupeh, Hsing-shan Hsien, *E. H. Wilson 2534a*, TYPE (A), May–Sept., 1907, alt. 600–1300 m.; Fang Hsien, *E. H. Wilson 2534b* (A), Aug., 1907, 1050 m. alt.; without locality, *A. Henry 4045* (G); Szechuan, Nanchuan Hsien, *W. P. Fang 1388* (A), June 3, 1928, alt. 2500–2700 m.

DISTRIBUTION: China (Hupeh, Szechuan).

This species was reduced by Rehder, Jour. Arn. Arb. **15:** 9. 1934, to the synonymy of *Sabia Dielsii* H. Lév. of Kweichow. It is distinguished from the latter by its minutely pubescent ovaries, sparingly pubescent styles, and its annular-margined disc, which is tumid and with three or four projecting longitudinal ribs, each with an inconspicuous indurated gland at about the middle. As I understand and interpret the species it is very closely allied to *Sabia yunnanensis* Franch.

6a. **Sabia puberula** Rehd. & Wils. var. **hupehensis** var. nov.

A typo differt pedunculis pedicellisque glabris.

CHINA: Hupeh, without locality, *A. Henry 6290*, TYPE (N), 1885–1888.

DISTRIBUTION: China (Hupeh).

Differs from the typical form of this species in its glabrous peduncles and pedicels. Henry's specimen was originally determined as representing *Sabia yunnanensis* Franch.

7. **Sabia yunnanensis** Franch. Bull. Soc. Bot. **33:** 465. 1886, Pl. Delav. 147. 1889; Diels, Bot. Jahrb. **29:** 451. 1900; H. Lév. Cat. Pl. Yunnan 250. 1917; Hand.-Maz. Symb. Sin. **7:** 644. 1933.

Apparently a deciduous scandent shrub, 3–4 m. high, the branches pale olivaceous to dark brown, terete, slender, flexuous, striate, glabrous; branchlets pale brown, terete, slender, sparsely pubescent or glabrous; bud-scales minutely puberulent, broadly ovate, the margins ciliate; leaves lanceolate to ovate-lanceolate, or oblong-ovate, 4–7.5 cm. long, 1–3 cm. wide, acute or acuminate, shortly acute or rounded at base, membranous to subchartaceous, shortly pubescent or glabrous on both surfaces, olivaceous on the upper surface, pale green or almost glaucous beneath, the margins very narrowly cartilaginous, minutely erose and subciliate, the nerves 4–6 pairs, slender, curved-ascending, arched-anastomosing, beneath slightly to distinctly elevated, the veinlets manifest on the lower surface, obscure above; petioles 6–10 mm. long, sparsely pubescent; inflorescences cymose, 3–4 cm. long, sparsely pubescent or glabrous, 2–4-flowered; peduncles 2–3 cm. long, the pedicels 4–7 mm. long, thickened upwards; bracteoles glabrous, linear, 1.5 mm. long, the margins sparsely ciliate; flowers greenish to greenish yellow, 10 mm. in diameter; calyx 5-lobed, glabrous, the lobes ovate or subrounded, 1 mm. long, acute or obtuse, the margins scarious, obscurely subdenticulate, eciliate; petals 5, thin, broadly obovate to obovate-elliptic, broadly rounded, 5 mm. long, 3–4 mm. wide, 7–8-nerved, the margins eciliate; stamens 5, subequal; filaments linear, 3–4 mm. long, glabrous; anthers ovoid, 0.5 mm. long, extrorse; disc tumid, with 3 or 4 projecting ribs, each rib bearing a minute but distinct disciform indurated gland on the edge, at about the middle, the margin annular, slightly crenate or wavy; ovary shortly but distinctly pubescent, conical, ovoid, or subpyramidal; styles 2.5 mm. long, glabrous, sometimes sparsely pubescent; stigmas minute, rounded; carpidia suborbicular or subreniform, 4–5 mm. in diameter, somewhat glaucous, glabrous, scrobiculations prominent, without persistent petals at the base.

CHINA: Yunnan, western slope of the Likiang Snow Range, *J. F. Rock 4243* (A, C, U), May–June, 1922, alt. 3600–3900 m.; eastern slope of the Likiang Snow Range, *J. F. Rock 4793* (A, C, U), May–Oct., 1922; Tsanghan Range, near Lake Talifu, *Rock 3114* in part (A), April 15–25, 1922, *G. Forrest 2096* in part (A), May, 1906, alt. 2700–3000 m.; Likiang Hsien, *C. W. Wang 70703* (A), July, 1935, alt. 2700 m.; Bodo, southeast of Chungtien, *K. M. Feng 1065* (A), May 26, 1939; Hokin, near Sung-kwei, *K. M. Feng 792* (A), April 23, 1939; Tali Range, *G. Forrest 4721, 4726* (A), June–Aug., 1906, alt. 2400–3000 m.; Tali Hsien, *C. W. Wang 63080, 63084* (A), May, 1935, alt. 2400 m.; Tche-hai, *E. E. Maire 281* (A), April, alt. 2500 m.; Southern Szechuan, between Mo So Ying and Kung Mu Ying, *C. Schneider 637* (A); between Kalapa and Liuku, *C. Schneider 1261* (A, C), May

17, 1914; Southwestern S z e c h u a n, Danfang, *Handel-Mazzetti 1066* (U), Apr. 1, 1914, alt. 1700 m. (as *S. Schumanniana* Diels); Ning Yüan Fu, *C. Schneider 998* (A, G), Apr. 23, 1914.

DISTRIBUTION: China (Yunnan, Szechuan).

This species was originally described from Yunnan material, *Delavay 793, 2031.*[1] I have seen none of these specimens, but have interpreted the species from Franchet's description. It is possible, however, that more than one species may be represented among the three collections cited by him, as he speaks of the leaves and peduncles as sometimes glabrous and sometimes pubescent. In interpreting the species I have depended partly on his description of the ovary as "pyramidatum pilosulum," as this seems to be a good distinguishing character. A great many Yunnan collections have been identified as representing Franchet's species, but many of these clearly represent other than *Sabia yunnanensis* Fr. Apparently Franchet's material came from the vicinity of Talifu, as in the introduction to his "Plantae Delavayanae" he states that Delavay's headquarters were at Talifu. In interpreting the species I have given particular attention to those collections available to me that were made in the general vicinity of that place, including specimens from the eastern and western slopes of Likiang Snow Range. The specimens above referred to *Sabia yunnanensis* Franchet vary considerably in the size and shape of the leaves, but the pilose ovary and the tumid discs with 3 or 4 projecting ribs impress me as constant and significant characters. As here interpreted, *Sabia yunnanensis* Franch. is very close to *S. puberula* Rehd. & Wils.

7a. **Sabia yunnanensis** Franch. var. **Mairei** (H. Lév.) stat. nov.

Celastrus Mairei H. Lév. Repert. Sp. Nov. **13**: 264. 1914.

A typo differt ovario glabro, foliis utrinque leviter consperse pubescentibus vel supra plus minusve pubescentibus et subtus glabris.

CHINA: Yunnan, Lou-ke-suin, *E. E. Maire s.n.*, syntype of *Celastrus Mairei* H. Lév., fragments and photo. (A), alt. 3000 m.; Tong Tchou-an, *E. E. Maire s.n.*, syntype of *C. Mairei* H. Lév., fragment and photo. (A), alt. 2600 m.; drainage basin of Lake Talifu, Tsangshan Range, *J. F. Rock 3114* in part (A), April 13, 1922, *3120* (N, U), alt. 2500 m., April 13–25, 1922; Hokin, Shiang-shu-ho by Ma-erh-shan near Sung-kwei, *K. M. Feng 746* (A), April 20, 1939; southeast of Hokin, on the way from Chiang-Ing to Domei on the Yangtze banks, *K. M. Feng 817* (A), April 25, 1939; eastern slopes of the Likiang Snow Range, *J. F. Rock 3531* (A, C, U), flowers greenish with a purplish tinge, *3672* (A, C, N, U), flowers green, alt. 3000–3600 m., *3732* (A, C, U), May–Oct., 1922, *G. Forrest 5574* (U), alt. 2700–3000 m., May, 1910; Likiang Hsien, *C. W. Wang 70719* (A), alt. 2700 m., July, 1935; Northwest Likiang, Chiao-tou on the Yangtze, *R. C. Ching 20685* (A), May 19, 1939; southeast of Chungtien, *K. M. Feng 962* (A), May 22, 1939; Kouty near Pin-tchouan, *F. Ducloux 117* (C, N), April, 1907, *S. Ten 544* (A, U), in 1918; Tchou-uen-tsen, *E. E. Maire 541* (A), alt. 2550 m.; without locality, *H. T. Tsai 57011* (A), in 1934, *T. T. Yü 15500* (A), in 1938, *E. E. Maire 1489* (U).

DISTRIBUTION: China (Yunnan).

Celastrus Mairei H. Lév. was reduced by Diels, according to Loesener, Ber. Deutsch. Bot. Ges. **32**: 543. 1914, to *Sabia yunnanensis* Franch., but it seems to differ from that species in its glabrous ovaries and in its leaves either more or less pubescent on both surfaces or pubescent on the upper surface and glabrous beneath. The specimens cited above differ considerably in leaf-shape, but the

[1] No. 793 from Pee-cha-ho mountains, near Mo-so-yn, and 2031 from Mao-kow-tchang, near Tapin-tze; three years later Franchet added *Delavay 149* from Ta-long-tan, near Tapin-tze, all Yunnan localities. The one altitude given is 2300 m. *Schneider 637*, cited above, is labelled as from Mo-so-ying and Kung-mu-ying, southern Szechuan.

ovary is constantly glabrous, which convinces me that but a single entity is involved.

8. **Sabia latifolia** Rehd. & Wils. in Sargent, Pl. Wils. **2:** 195. 1914; Stapf, Bot. Mag. **146:** *t. 8859.* 1920; Rehd. & Wils. Jour. Arn. Arb. **8:** 164. 1927; Hand.-Maz. Symb. Sin. **7:** 644. 1933.

An evergreen, scandent shrub, about 2–3 m. high, the branches dull green to brownish purple, terete, lenticellate, flexuous, glabrous; branchlets greenish yellow, terete, striate, sparingly pubescent; bud-scales broadly ovate, pubescent or sparsely pubescent, the margins ciliate; leaves elliptic-oblong or elliptic, rarely ovate, 5–14 cm. long, 2–7 cm. wide, usually short-acuminate, cuneate to broadly acute or even subtruncate-rounded at base, membranaceous (when young) to chartaceous, green to olivaceous, very sparsely pubescent, becoming glabrous on the upper surface, paler beneath and with widely spaced short hairs from slightly thickened bases on the nerves beneath, the margins scarious, obscurely ciliate, becoming glabrous; nerves 5 pairs, curved-ascending, arcuate-anastomosing, distinct above, beneath in mature leaves strongly raised, with the reticulations prominent on the lower surface; petioles 0.7–2 cm. long, somewhat pubescent, becoming glabrous; inflorescences cymose, 3–4.5 cm. long, sparsely pubescent, mostly 3-flowered; peduncles 2–3 cm. long; pedicels 4–5 mm. long, slightly thickened upwards; bracteoles caducous; flowers 8–10 mm. in diameter; calyx equally 5-lobed, sparsely pubescent, the lobes suborbicular, rarely broadly ovate, 0.5 mm. long, obtuse or acute, the margins minutely erose, sparsely ciliate; petals 5, thin, elliptic-ovate to obovate, 4–5 mm. long, 3–4 mm. wide, usually broadly rounded, 5–7-nerved, the margins ciliate; stamens 5, subequal; filaments flat, narrowed upward, 3–5 mm. long, glabrous; anthers ovoid, 1 mm. long, introrse; disc tumid with 3 or 4 slightly projecting ribs, the margin slightly undulate, the indurated glands none; ovary ovoid or conical, pubescent to sparsely pubescent; styles 4 mm. long, glabrous; stigmas minute, rounded; mature carpidia blue (when fresh), subreniform, 7–8 mm. in diameter, glabrous, the scrobiculations distinct, without persistent petals at the base.

CHINA: Western Szechuan, Wa-shan, *E. H. Wilson 818,* TYPE (A), isotype (G, U), *2530* (A, U); southeast of Tachien-lu, *E. H. Wilson 2531* (A, U), in thickets, alt. 1200–2250 m., flowers greenish, June and August, 1908.

DISTRIBUTION: China (Szechuan).

This species is allied to *Sabia yunnanensis* Franchet of Yunnan, but is distinguished by its tumid disc with slightly projecting ribs without indurated glands, while the stamens are introrsely antheriferous. Rehder, Jour. Arnold Arb. **8:** 164. 1927, records this species from Anhwei on the basis of *Steward 1168,* but I refer this specimen to *Sabia* sp.

9. **Sabia Yuii** sp. nov.

Frutex sempervirens, ut videtur scandens vel subscandens, 2–3 m. altus, ramis subgriseis, sublenticellatis, teretibus, subflexuosis, glabris; ramulis brunneis vel subviridibus, striatis, glabris; perulis glabris, ovatis, acuminatis, margine minutissime ciliatis; foliis subchartaceis, plerumque oblongo-ovatis, 6–9 cm. longis, 2.5–5 cm. latis, acuminatis, basi late truncato-rotundatis vel truncato-subcordatis, utrinque glabris, supra olivaceo-brunneis, subtus pallidis, margine anguste scarioso-cartilagineis, eciliatis; nervis 5 vel 6 utrinque, curvato-adscendentibus, arcuato-anastomosantibus, supra obscuris, subtus elevatis, perspicuis, venulis laxe reticulatis; petiolo 7–10 mm. longo, consperse pubescente vel glabro; inflorescentiis axillaribus, solitariis, cymosis, 2.5–4 cm. longis, glabris, 2–4-floris; pedunculis circiter 2 cm. longis; pedicellis 5–10 mm. longis; bracteolis glabris, linearibus, 1–1.5 mm. longis, margine minutissime ciliatis; floribus pallide viridibus, 10 mm. diametro; calycibus aequaliter 5-lobatis, lobis ovatis, 0.5 mm. longis,

obtusis vel rotundatis, margine sparse minutissime ciliatis; petalis 5, aequalibus, membranaceis, saepe deorsum in partibus medianis minute rubro-punctatis, plerumque late obovatis, rotundatis, 5 mm. longis, 4 mm. latis, 7-nerviis, margine minutissime ciliatis; staminibus 5, inaequalibus; filamentis complanatis, minutissime rubro-punctatis, sursum angustatis, 2–2.5 mm. longis, glabris; antheris oblongis, 1 mm. longis, extrorsis; disco tumido, 4-costulato, eglanduloso, margine annulari vel obscure undulato; ovario subconico vel ovoideo, glabro; stylis circiter 3 mm. longis, glabris; stigmatibus minutis, rotundatis; carpidiis ignotis.

China: Yunnan, Shunning, Snow Range, *T. T. Yü 15975*, type (A), May 26, 1938, alt. 3000 m., a rare shrub, 5–10 feet high, in thickets, flowers pale green.

Distribution: China (Yunnan).

This is characterized by its broadly truncate-rounded or truncate-subcordate leaf-bases and its minutely but noticeable ciliate-margined petals.

10. **Sabia gaultheriifolia** Stapf in herb. sp. nov.

Sabia gaultherifolia Stapf (err. "Dunn") ex Anon. Acta Phytotax. Geobot. **5**: 78. 1936, in clavis Japonice, *nomen nudum*.

Frutex scandens, sempervirens, ramis subcinereis vel atro-brunneis, teretibus, glabris; ramulis pallide viridibus vel pallide olivaceis, teretibus, striatis, glabris; perulis sparse pubescentibus vel glabrescentibus, late ovatis, margine ciliatis; foliis oblongo-ovatis, oblongis, vel oblongo-subellipticis, 6–11 cm. longis, 2–4 cm. latis, acuminatis vel subacutis, basi late acutis vel obtusis, chartaceis, utrinque glabris, supra olivaceis vel brunneis, subtus pallidioribus, margine angustissime cartilagineis, eciliatis; nervis 4 vel 5 utrinque, curvato-adscendentibus, arcuato-anastomosantibus, supra haud perspicuis, subtus distinctis elevatis, secundariis reticulisque manifestis; petiolo circiter 1 cm. longo, glabro; floribus (haud visis) axillaribus terminalibusque solitariis, pedicellis sub fructu 2.5–5.5 cm. longis, glabris, sursum incrassatis; bracteolis nullis; sepalis sub fructu glabris, aequalibus, ovatis vel triangularibus, circiter 1 mm. longis, obtusis vel rotundatis, margine eciliatis; disco subannulari, longitudinaliter distincte 5-costulato, incrassato, margine indurato, subtruncato, vel obscure undulato, glandulis induratis nullis; ovario ovoideo, glabro; stylis 3–4 mm. longis, glabris; stigmatibus minutis, rotundatis; carpidiis suborbicularibus vel subreniformibus, circiter 7 mm. diametro, glabris, scrobiculatis, primo rubris, maturis azureis, petalis ad basim haud persistentibus.

China: Hupeh, Chang-yang, *A. Henry 6227*, type (G, U), *6022* (G); Patung, *Henry 7298* (K, photo. N); Kiangsi, Lushan Mountain, *H. H. Chung & S. C. Sun 627, 735* (A, N), July–Aug., 1935, alt. 700–800 m.; Fukien, Buong Kang, Yenping, *H. H. Chung 3409* (A, C), June 15, 1925, alt. 500 m., fruit first red then blue when ripe; Chekiang, Chen Chiong, south of Siachu, *R. C. Ching 1764* (U), May–Sept., 1924, alt. 850 m.; Southern Chekiang, region of King Yuan, *R. C. Ching 2391* (A, U), Aug.–Sept., 1924, alt. 1100 m., fruit blue when mature; without locality, *R. C. Ching s.n.* (A).

Distribution: China (Hupeh, Kiangsi, Fukien, Chekiang).

At Kew there are two sheets representing three collections in the *Sabia gaultheriifolia* cover, *Henry 6227* from Chang-yang, *Henry 7298* from Patung, and *Henry 3126* from Ichang, all in Hupeh Province; *Henry 6022* from Hupeh was placed by Stapf in the *Sabia sinensis* cover, but I believe it to be referable to *S. gaultheriifolia* Stapf. In separating *S. gaultheriifolia* and *S. sinensis*, Stapf gives the following key characters: "nervation sharply prominent on both sides, branches dark, then grey, leaves acutely acuminate.....*gaultheriifolia*," and "nervation less markedly prominent, branches remaining green a long time; blades subacuminate, not very acute.....*sinensis*." The only specimen in the *Sabia sinensis* cover that has its "blades subacuminate, not very acute" is *Tutcher 10862A* of which I have an excellent photograph kindly sent by Dr.

A. D. Cotton. I interpret this as the type of *S. sinensis* Stapf and have placed this as a variety of *Sabia japonica* Maxim. *Sabia gaultheriifolia* Stapf may be distinguished by its distinct and prominent reticulations on the lower surface of the leaves. The indicated disc characters are taken from fruiting specimens, and flowers are as yet unknown. I take the species to be a representative of the section *Pachydiscus*.

11. **Sabia Metcalfiana** sp. nov.

Frutex sempervirens, scandens, ramis ramulisque brunneis vel purpureo-brunneis, teretibus, striatis, glabris; perulis sparse pubescentibus vel glabris, lanceolatis, margine ciliatis; foliis oblongo-ovatis, 7–12 cm. longis, 3–6 cm. latis, longe acute acuminatis, basi rotundatis vel late acutis, chartaceis vel subcoriaceis, utrinque glabris, nitidis, supra olivaceis vel brunneis, subtus pallidioribus, margine anguste cartilagineis, leviter revolutis, eciliatis; nervis 4 vel 5 utrinque, gracilibus, curvatis, arcuato-anastomosantibus, subtus distincte elevatis, venulis manifestis, supra obscuris; petiolo 1–1.5 cm. longo, glabro; inflorescentiis axillaribus, solitariis, brevissime (1–2 mm.) pedunculatis, 4- vel 5-floris, sub anthesi folia parva (ad 1.5 cm. longa) gerentibus, axibus 3–7 mm. longis, floribus ut videtur viridibus, depauperato-racemosim dispositis; pedicellis filiformibus, 1.5–2 cm. longis; bracteolis nullis; floribus 8 mm. diametro; calycibus glabris, lobis 5, aequalibus, ovatis, circiter 1 mm. longis, acutis, margine erosulis, eciliatis; petalis 5, aequalibus, membranaceis, obscure obovatis, late rotundatis, 4 mm. longis, 3 mm. latis, 5-nerviis, nervis distinctis, margine eciliatis; staminibus 5, aequalibus; filamentis linearibus 3–4 mm. longis, glabris; antheris ovoideis, 1 mm. longis, extrorsis; disco subcylindraceo, sub anthesi haud incrassato, longitudinaliter obscure 5-costato, truncato vel obscure subcrenulato, glandulis induratis nullis; ovario ovoideo, glabro; stylis exsertis, filiformibus, 5 mm. longis, glabris; stigmatibus minutis, rotundatis; carpidiis ignotis.

China: Yunnan, Lung-ling Hsien, *H. T. Tsai 54582* (A), *55007*, type (A), Jan. 6–7, 1934, alt. 2200–2400 m., a scandent shrub in ravines, flowers apparently green.

Distribution: China (Yunnan).

The inflorescences are axillary and solitary, the axis being but 3–7 mm. long, and at anthesis bearing a few thin small leaves which subtend the flowers and which apparently do not persist, the inflorescence being a depauperate raceme rather than a cyme, the slender pedicels elongating after anthesis and apparently most of the small leaves falling. Tsai's note on his number *55007* is "flower green" and that on number *54582* is "flower purple," but the two numbers seem safely to represent a single species. The disc is not as strongly developed as in other species of the section *Pachydiscus*, yet I feel confident that it belongs here. Dedicated to Professor Franklin P. Metcalf of Lingnan University, Canton, China.

12. **Sabia pentadenia** sp. nov.

Frutex scandens videtur sempervirens, ramis atropurpureis vel pallide flavido-viridibus, teretibus, substriatis, lenticellatis, glabris; ramulis pallide olivaceis vel viridi-flavidis vel flavidis, teretibus, striatis, glabris; perulis minute obscure puberulis, ovatis, acuminatis, margine brevissime ciliatis; foliis ovatis vel oblongo-ovatis, 5.5–8 cm. longis, 2–3 cm. latis, perspicue acute acuminatis, basi late rotundato-truncatis vel subcordatis, coriaceis, utrinque nitidis, supra pallide viridibus, subtus pallidioribus, glabris, margine cartilagineis, eciliatis, anguste revolutis; nervis utrinque 5, gracilibus, arcuato-anastomosantibus, supra obscuris, subtus elevatis; petiolo circiter 5 mm. longo, glabro; inflorescentiis axillaribus, solitariis, 3–4 cm. longis, glabris, 1- vel 2-floris; pedunculis gracilibus, circiter 2.5 cm. longis; pedicellis subclavatis, circiter 1 cm. longis; bracteolis caducis;

floribus 10 mm. diametro; calycibus glabris, lobis 5, aequalibus, ovatis, circiter 1 mm. longis, obtusis, margine leviter ciliatis; petalis 5, aequalibus, subchartaceis, deorsum obscurissime minute punctato-glandulosis, late obovatis, 5 mm. longis, 5 mm. latis, apice late rotundatis, 7-nerviis; staminibus 5, subaequalibus; filamentis 3–4 mm. longis, sursum angustatis glabris, deorsum minutissime obscure rubro-glandulosis; antheris oblongis, 1 mm. longis, introrsis; disco tumido, leviter et late 5-costulato, margine undulato, glandulis 5 conspicuis induratis parvis disciformibus; ovario ovoideo, glabro; stylis circiter 4 mm. longis, minutissime rubro-glandulosis, glabris; stigmatibus minutis, rotundatis; carpidiis subreniformibus vel suborbicularibus, 5–6 mm. diametro, glabris, scrobiculatis, petalis ad basim haud persistentibus.

CHINA: Yunnan, without locality or notes, *H. T. Tsai 62875* (A), TYPE, 1934.
DISTRIBUTION: China (Yunnan).

This species can be distinguished by its five small prominent indurated glands spaced at regular intervals on the undulate margin of the somewhat 5-ribbed tumid disc.

13. **Sabia Croizatiana** sp. nov.

Frutex sempervirens vel deciduus?, scandens, ramis flavo-viridibus vel purpureo-brunneis, teretibus, flexuosis, striatis, glabris; ramulis pallide viridibus, teretibus, gracilibus, striatis, glabris; perulis glabris, ovatis vel lanceolatis, margine ciliatis; foliis parvis, oblongo-lanceolatis vel anguste oblongo-ellipticis, 2.5–4.5 cm. raro 5 cm. longis, 5–10 mm. raro 15 mm. latis, acutis vel breviter acute acuminatis, basi late acutis obtusis vel subrotundatis, membranaceis vel chartaceis, utrinque glabris, supra plerumque olivaceis, subtus pallidis, subcinereis vel subglaucis, margine scarioso-subcartilagineis, angustissime revolutis; nervis 4 vel 5 utrinque, curvato-adscendentibus, arcuato-anastomosantibus, gracilibus, subtus leviter elevatis, venulis laxe reticulatis, supra obscuris; petiolo 2–4 mm. longo, gracili, glabro; inflorescentiis cymosis, circiter 1–2 cm. longis, glabris, 2–4-floris; pedunculis filiformibus, circiter 10–12 mm. longis; pedicellis filiformibus, 2–5 mm. longis; floribus viridibus vel flavido-viridibus, 8 mm. diametro; calycibus glabris, lobis 5, aequalibus, minute obscurissime rubro-puncticulatis, ovatis, circiter 1 mm. longis, obtusis, margine eciliatis; petalis 5, aequalibus, membranaceis, deorsum vel in partibus medianis minute obscure punctato-glandulosis, oblongo-ellipticis vel late ellipticis vel obovatis, late rotundatis, circiter 4–5 mm. longis, 1.5–4 mm. latis, circiter 7-nerviis, margine eciliatis; staminibus 5, inaequalibus; filamentis 2–4 mm. longis, complanatis, sursum angustatis, glabris; antheris oblongis, 0.5 mm. longis, extrorsis; disco tumido, costulato, costulis 5, prominentibus, in partibus medianis glandula minutissima disciformi indurata praeditis, margine annularibus; ovario ovoideo, glabro; stylis circiter 2.5 mm. longis, glabris; stigmatibus minutis, rotundatis; carpidiis ignotis.

CHINA: Yunnan, Tché-Ky, *E. E. Maire 326,* TYPE (A), *335* (A), May, flowers greenish yellow, alt. 2990 m.; Siao-ho, *E. E. Maire 3639* (C, N, U), flowers yellowish, May, 1910, alt. 2000 m.; Sou-pin-Chao, *S. Ten 357* (A, C, U), April 19, 1917, flowers green; Tali Shan, *G. Forrest 19379* (A, U), May, 1921, alt. 3000–3300 m., flowers green; Tali Range, *G. Forrest 4707* (A), alt. 2700–3000 m.; Eastern Likiang, Tze-li, *R. C. Ching 20231* (A), April 27, 1939, flowers yellowish green; Chung-tien, *J. F. Rock 24718* (A, C, N, U), April to May, 1932, flowers yellow, alt. 3600 m., in cane-brake spruce forest; Kien-shuei Hsien, *H. T. Tsai 53037* (A), April 8, 1933, alt. 1900 m., flowers green.
DISTRIBUTION: China (Yunnan).

This species is very similar to *Sabia yunnanensis* Fr. var. *Mairei* (H. Lév.) Chen, and like the latter has glabrous ovaries and tumid ribbed discs, each rib bearing a minute but noticeable disciform indurated gland about halfway up. With strong transmitted light and a reasonably high magnification, the sepals and the basal (or median) parts of the petals appear characteristically but minutely reddish-punctate-glandular. The leaves are consistently smaller than

in *Sabia yunnanensis* var. *Mairei*. The new species is named in honor of Dr. Leon Croizat, of the Arnold Arboretum, Harvard University.

14. **Sabia omeiensis** Stapf in herb. sp. nov.

Sabia omeiensis Stapf (err. "Dunn") ex Anon. Acta Phytotax. Geobot. **5**: 77. 1936, in clavis Japonice, *nomen nudum*.

Frutex suberectus videtur deciduus, ramis nigris, teretibus, flexuosis, striatis, lenticellatis, glabris; ramulis nigris vel pallide olivaceis, teretibus, gracilibus, leviter flexuosis, obscure striatis, glabris; perulis glabris, ovatis, acutis, margine ciliatis; foliis ellipticis vel oblongo-ellipticis, 3–9 cm. longis, 1.5–4 cm. latis, acutis vel breviter acuminatis, basi obtusis vel rotundatis, membranaceis, utrinque glabris, supra atro-olivaceis, subtus paullo pallidioribus, margine eciliatis angustissime cartilagineis; nervis 5 utrinque, curvato-adscendentibus, arcuato-anastomosantibus, subtus elevatis, supra obscuris, venulis laxe reticulatis; petiolo 5–10 mm. longo, glabro; inflorescentiis cymosis, 2–4 cm. longis, glabris, 2- vel 3-floris; pedunculis gracilibus, 1–2 cm. longis; pedicellis 5–10 mm. longis; bracteolis caducis; floribus circiter 10 mm. diametro, plerumque pallide rubro-viridibus vel purpureo-viridibus; calycibus glabris, lobis 5, aequalibus, triangulari-ovatis, 1 mm. longis, acutis, margine eciliatis; petalis 5, aequalibus, elliptico-obovatis, 5 mm. longis, 3–3.5 mm. latis, late rotundatis, 5-nerviis, nervis perspicuis, margine sparse ciliatis; staminibus 5, inaequalibus; filamentis complanatis, 3–4 mm. longis, glabris; antheris ovoideis, 1 mm. longis, extrorsis; disco tumido, longitudinaliter 3-costulato, in partibus medianis glandula minutissima indurata obscure praedito, margine annulari vel undulato; ovario ovoideo vel subconico, glabro; stylis circiter 3 mm. longis, glabris; stigmatibus minutis, rotundatis; carpidiis ignotis.

China: Szechuan, Mount Omei (Omei Shan), *E. H. Wilson, Veitch Exped. 4713*, type (K) frustulum (A) photo. (N), *T. T. Yü 382* (A), April 18, 1932, alt. 1850 m., scandent, in woods, flowers purplish red; O-pien-Hsien, *T. T. Yü 613, 662, 779* (A), May 3–16, 1932, alt. 2200 m., shrub five feet, in woods, flowers reddish green; west of Kuan Hsien, *F. T. Wang 20846* (A), May 15, 1930, alt. 2260 m., shrub eight feet, on slope in thickets.

Distribution: China (Szechuan).

Doctor Stapf named this species, basing it wholly on *Wilson 4713* (Veitch Exp.), this specimen at Kew bearing the name *Sabia omeiensis* in Stapf's handwriting. Of this I have seen a single flower courteously sent by Dr. A. D. Cotton of the Royal Botanic Gardens, Kew. The floral characters of *Wilson 4713* closely approximate those of the several specimens listed above. There is considerable variation in the shape and size of the leaves among the specimens cited, but this is apparently due to varying stages of development.

15. **Sabia Schumanniana** Diels, Bot. Jahrb. **29**: 451. 1900; Rehd. & Wils. in Sargent, Pl. Wils. **2**: 196. 1914; Hand.-Maz. Symb. Sin. **7**: 643. 1933.

An evergreen, scandent shrub, 2–3 m. high; branches and branchlets olivaceous to pale yellowish green, slender, terete, striate, glabrous or when young sparingly pubescent; bud-scales glabrous, ovate, the margin ciliate; leaves lanceolate or oblong-lanceolate, 5–12 cm. long, 1.5–2.5 cm. (rarely 3 cm.) wide, acute or shortly acuminate, rounded or acute at base, chartaceous or when young membranaceous, above pale to greenish olivaceous, glabrous on both surfaces when mature, shiny, sometimes sparsely pubescent on the midrib and the lateral nerves above, somewhat paler beneath, the margins scarious or narrowly cartilagineous, minutely erose, eciliate; nerves 4 or 5 pairs, slender, curved-ascending and joined by means of the secondary veins near the margin, elevated, the reticulations distinct on both surfaces; petiole 3–6 mm. long, glabrous or occasionally with a few hairs on margins; inflorescences cymose, 4–6 cm. long, sparsely and obscurely pubescent or glabrous, 2–4-flowered; peduncles filiform, 2–4 cm. long;

pedicels filiform, 0.5–1.5 cm. long; bracteoles glabrous, narrowly lanceolate, 1–2 mm. long; flowers 8–10 mm. in diameter, green; calyx equally 5-lobed, glabrous, the lobes ovate or broadly ovate, about 1 mm. long, acute or obtuse, the margin subciliate or eciliate; petals 5, equal, thin, suborbicular to broadly obovate, broadly rounded, 4–5 mm. long, 4–4.5 mm. wide, 5–7-nerved, the margins subciliate; stamens 5, subequal; filaments complanate, 2.5–4.5 mm. long, glabrous; anthers ovoid, 1 mm. long, extrorse; disc tumid, with 4 narrow not prominent ribs, the margin annular or slightly wavy, the indurated glands none; ovary ovoid, glabrous; styles 4 mm. long, glabrous; stigmas minute, rounded; carpidia at first red, then blue, suborbicular or subreniform, about 5 mm. in diameter, glabrous, distinctly scrobiculate, without persistent petals at the base.

CHINA: Hupeh, Patung Hsien, *H. C. Chow 313, 323, 654* (A, N), May and June, 1934; without locality, *A. Henry 5421, 6114* (G, U); Szechuan, Nan Ch'uan, *C. Bock & von Rosthorn 2026* iso-syntype (fragment and photo. A); Wa-shan, *E. H. Wilson 860* (A, U), alt. 1200–1800 m., July and September, 1908; Ma-pien Hsien, *F. T. Wang 23045* (A), May 28, 1931, alt. 2000 m.; without locality, *Henry 7240* (G), *5421B* (G, N); Yunnan, Yong Shan Hsien, *H. T. Tsai 50982* (A), June 2, 1932, alt. 2100 m.; without locality, *E. E. Maire s.n.* (A).

DISTRIBUTION: China (Hupeh, Szechuan, Yunnan).

This species is characterized by its narrow leaves and by its long and slenderly peduncled 2–4-flowered inflorescences, the flowers being subumbellately arranged, their pedicels very unequal in length. There are no indurated glands on the disc. *Chow 313* and *Henry 5421* and *5421B* have somewhat smaller leaves than the other cited specimens, but I find no floral or fruit characters by which these can be distinguished from the typical form.

15a. **Sabia Schumanniana** Diels var. **pluriflora** Rehd. & Wils. in Sargent, Pl. Wils. 2: 197. 1914, excl. *Henry 5421, 5421B, 6114.*

Differs from the typical form of this species particularly by its 6–20-flowered cymes.

CHINA: Western Hupeh, Hsing-shan Hsien, *E. H. Wilson 2534,* TYPE (A), flowers brownish chocolate, alt. 900–1800 m., May 6, 1907; without locality, *E. H. Wilson 582* (N), May, 1900.

DISTRIBUTION: China (Hupeh).

15b. **Sabia Schumanniana** Diels var. **longipes** Rehd. & Wils. in Sargent, Pl. Wils. 2: 197. 1914.

Differs from the preceding variety by its longer leaves (up to 20 cm. long), and its much longer, much more lax inflorescences, their peduncles being 6 to 9 cm. long.

CHINA: Western Szechuan, Chin-ting-shan, *E. H. Wilson 2529,* TYPE (A), alt. 1300 m., May 22, 1908, flowers greenish purple; Kuan Hsien, *W. P. Fang 2178* (A), July 13, 1928.

DISTRIBUTION: China (Szechuan).

These two varieties are clearly not strong ones, but both the one from Hupeh and the other from Szechuan differ from the species notably in their much more numerous flowers. I note no essential floral differences between these and the species. Additional collections may indicate the desirability of some other disposition of them.

16. **Sabia glandulosa** sp. nov.

Frutex sempervirens, scandens, 2 m. altus, ramis ramulisque pallide vel atro-viridibus, teretibus, gracilibus, striatis, glabris; perulis glabris, ovatis, acuminatis, margine ciliatis; foliis oblongo-ovatis, 5–9.5 cm. longis, 2.5–3 cm. latis, graciliter longe subfalcato-acuminatis, basi obtusis vel subrotundatis, chartaceis, supra nitidis, subatro-olivaceis, conspersissime breviter pubescentibus glabrescentibus,

subtus pallide viridibus, nitidis, glabris vel secus costam nervosque parcissime breviter subsetoso-pubescentibus, margine subcartilagineis erosulis, junioribus breviter ciliatis, vetustioribus glabris; nervis primariis 4 vel 5 utrinque, curvato-adscendentibus, arcuato-anastomosantibus, subtus elevatis, distinctis, venulis sublaxe reticulatis, manifestis; petiolo 5–10 mm. longo, glabro vel sparse pubescente; inflorescentiis cymosis, circiter 3.5 cm. longis, glabris, 2- vel 3-floris; pedunculis gracilibus, 1.5 cm. longis, pedicellis subclavatis, 1 cm. longis; bracteolis glabrescentibus, linearibus, 0.5 mm. longis; floribus ignotis; calycibus glabris, lobis 5, aequalibus, late ovatis vel ovatis, 0.5 mm. longis, obtusis vel late obtusis; disco tumido, ecostulato, in partibus medianis glandulis 5 prominentibus parvis induratis disciformibus instructo, margine annulari vel undulato; ovario conico, glabro; stylis 4 mm. longis, glabris; stigmatibus minutis, rotundatis; carpidiis ignotis.

CHINA: Yunnan, Southern Chungtien, Kung-shiang-shu, Snow Mountain, on the way to Kai-lou-wei on the banks of the Yangtze River, *K. M. Feng 1834,* TYPE (A), July 25, 1939, alt. 2900 m., climber 2 m. high, on open thickets.

DISTRIBUTION: China (Yunnan).

In vegetative characters and in its general appearance this species approximates *Sabia shensiensis* Chen, but is distinguished by its five small prominent disciform indurated glands, which are equatorially located on the tumid disc.

17. **Sabia angustifolia** sp. nov.

Frutex sempervirens (vel deciduus ?), scandens, 3–6 m. altus, ramis olivaceo-brunneis, teretibus, striatis, glabris; ramulis plerumque pallide viridibus, gracilibus, teretibus, leviter flexuosis, obscure striatis, consperse, patule et breviter pubescentibus; perulis pubescentibus, ovatis, margine ciliatis; foliis lanceolatis vel anguste ovato-lanceolatis, 4–7 cm. longis, 1–1.5 cm. latis, sursum sensim angustatis, apice acute acuminatis, basi late acutis vel obtusis, raro subrotundatis, firme membranaceis vel subchartaceis, supra olivaceo-viridibus, glabris vel parcissime pubescentibus, subtus pallidioribus, breviter obscure conspersissime puberulis glabrescentibus, margine scariosis, parcissime breviter ciliatis, nervis 4 vel 5 utrinque, gracilibus, curvato-adscendentibus, circiter ad marginem arcuato-anastomosantibus, gracilibus, subtus leviter elevatis, venulis laxe reticulatis, supra obscuris; petiolo 5 mm. longo, glabro vel conspersissime pubescente; inflorescentiis axillaribus, solitariis, glabris, cymosim 1- vel 2-floris; pedunculis gracilibus, 1.5–2 cm. longis; pedicellis sursum incrassatis, sub fructu circiter 1.5 cm. longis; bracteolis caducis; floribus ignotis; calycibus glabris, lobis 5, aequalibus, ovatis vel late ovatis, circiter 1 mm. longis, acutis vel obtusis, margine ciliatis; disco tumido, ecostulato, glandulis 5 minutis induratis disciformibus in partibus medianis ornato, margine annulari; ovario conico, glabro; stylis subulatis, 3.5 mm. longis, glabris; stigmatibus minutis, capitatis; carpidiis nitidis, nigris, suborbicularibus, circiter 5 mm. diametro, glabris, leviter scrobiculatis, petalis ad basim haud persistentibus.

CHINA: Yunnan, Chien-chuan-Mekong divide, *G. Forrest 21472,* TYPE (A, U), July, 1922, alt. 9000 m., a scandent shrub 3–5 m. high, growing in thickets by streams, fruit black when dry (the note on the specimen in relation to the fruit is not very intelligible: "In fruit, fruits darkest"; they are probably dark blue when fresh).

DISTRIBUTION: China (Yunnan).

This species is distinguished by its small lanceolate or narrowly ovate-lanceolate leaves and by its tumid not ribbed disc being supplied with five small indurated disciform glands spaced at regular intervals around its equatorial part.

18. **Sabia shensiensis** sp. nov.

Frutex, ut videtur sempervirens, erectus (vel scandens ?), ramis ramulisque pallide flavido-viridibus vel olivaceis, teretibus, striatis, glabris; perulis pubescen-

tibus, ovatis, acuminatis, margine ciliatis; foliis ellipticis vel lanceolatis, 3–11 cm. longis, 1.5–4 cm. latis, acutis vel breviter acuminatis, basi acutis, membranaceis vel chartaceo-membranaceis, utrinque conspersissime breviter subciliatis, supra viridibus, subtus pallidioribus, margine anguste scarioso-cartilagineis, erosulis, primo breviter ciliatis; nervis 4–6 utrinque, gracilibus, curvato-subadscendentibus, arcuato-anastomosantibus, supra obscuris, subtus perspicuis, elevatis, venulis ultimis subtus elevatis, sublaxe reticulatis; petiolo circiter 1 cm. longo, gracili, consperse ciliato; fructibus axillaribus, solitariis, pedicellis circiter 3 cm. longis, subclavatis, primo pilis paucis brevibus instructis glabrescentibus, circiter 3 cm. longis; bracteolis nullis; floribus ignotis; sepalis sub fructu glabris, lobis 5, aequalibus, subrotundatis, circiter 0.5 mm. longis, obtusis, margine eciliatis; disco tumido, ecostulato, ad basim glandulis 5 parvis induratis irregulariter disciformibus instructo, margine leviter undulato; ovario conico vel ovoideo, glabro; stylis 4 mm. longis, glabris; stigmatibus minutis, rotundatis; carpidiis leviter compressis, inaequilateraliter obovatis vel suborbicularibus, circiter 5 mm. diametro, glabris, scrobiculatis, petalis ad basim haud persistentibus.

China: Shensi, Tai-pei-shan, *W. Purdom 894*, type (A), in 1910, without notes.
Distribution: China (Shensi).

This species is distinguished from *Sabia glandulosa* Chen by its disc-glands being located near the base of the tumid disc.

19. **Sabia bicolor** sp. nov.

Frutex ut videtur sempervirens, scandens, ramis pallide viridibus vel subolivaceo- vel brunneo-viridibus, teretibus, flexuosis, striatis, glabris, ramulis pallide viridibus, teretibus, gracilibus, striatis, parcissime pubescentibus vel glabris; perulis glabris, ovatis, margine ciliatis; foliis lanceolatis vel oblongo-lanceolatis, 2.5–5 cm. longis, 0.8–1.5 cm. latis, acutis vel leviter acuminatis, basi subrotundatis vel obtusis, submembranaceis vel subchartaceis, supra olivaceis vel atro-olivaceis, sparse pubescentibus glabrescentibus, subtus pallidis, subglaucis, glabris, margine angustissime subscarioso-cartilagineis, primo breviter ciliatis, maturis eciliatis; nervis 3–5 utrinque, gracilibus, curvato-adscendentibus, arcuato-anastomosantibus, subtus leviter elevatis, venulis laxe reticulatis, supra obscuris; petiolo 2–5 mm. longo, gracili, sparse pubescente; inflorescentiis cymosis, 1–3 cm. longis, glabris, 2- vel 3-floris; pedunculis gracilibus, circiter 1–1.5 cm. longis; pedicellis gracilibus, 4–7 mm. longis, bracteolis caducis; floribus pallide viridibus vel albido-viridibus; calycibus glabris, lobis 5, aequalibus, triangulari-ovatis, circiter 0.5 mm. longis, acutis vel subacutis, margine erosulis, minutissime ciliatis; petalis 5, aequalibus, membranaceis, obovatis, suborbiculari-obovatis, vel obovato-ellipticis, 3–4 mm. longis, 2.5–3.5 mm. latis, 7- vel 8-nerviis, late rotundatis, margine eciliatis; staminibus 5, inaequalibus; filamentis 1.5–3.5 mm. longis, complanatis, glabris, sursum angustatis; antheris ovoideis, circiter 1 mm. longis, extrorsis; disco tumido, 5-costato, undulato, margine glandulis 5 parvis irregularibus disciformibus induratis ornato; ovario oblongo-ovoideo, glabro; stylis circiter 3 mm. longis, glabris; stigmatibus minutis, capitatis; carpidiis immaturis obovatis, deorsum inaequilateralibus, circiter 4 mm. diametro, distincte scrobiculatis, petalis ad basim haud persistentibus.

China: Yunnan, Lao-ho-shan, Chen-kiang, *H. Wang 41415*, type (A), July 8, 1939, altitude apparently about 2600 m., a scandent shrub, fruit (immature) green; Chenkiang, *Y. Tsiang & H. Wang 16281* (A), alt. 1800–2000 m.; Kunming, *C. W. Wang 62809, 62818* (A), April, 1935, scandent on slopes, alt. 2000 m.; without locality, *Ducloux 6* (C).
Distribution: China (Yunnan).

This species may be recognized by its small, narrowly lanceolate or elliptic leaves which are sparsely pubescent on the midrib on the upper surface and glabrous and subglaucous beneath, and by its 5 minute indurated irregular disci-

form glands, which are spaced at regular intervals on the undulate margin of the tumid disc.

20. **Sabia callosa** sp. nov.

Frutex scandens ut videtur sempervirens, ramis plerumque olivaceo-brunneis, ramulis pallide olivaceis vel flavido-viridibus, teretibus, striatis, glabris; perulis glabris, late ovatis, margine ciliatis; foliis oblongis vel oblongo-ellipticis, 5–9 cm. longis, 1.5–2.5 cm. latis, plerumque perspicue acute acuminatis, basi late acutis vel subrotundatis, submembranaceis vel subchartaceis, supra olivaceis, subtus pallidioribus, utrinque glabris, margine anguste cartilagineis; nervis 4–6 utrinque, gracilibus, curvato-adscendentibus, arcuato-anastomosantibus, subtus elevatis, venulis laxe reticulatis, conspicuis, supra obscuris; petiolo 5–7 mm. longo, glabro vel junioribus obscure pubescente; inflorescentiis axillaribus, solitariis, 2–3 cm. longis, glabris, ut videtur 1- vel 2-floris; pedunculis gracilibus, 1 cm. longis; pedicellis sub fructu clavatis, 1–2 cm. longis; bracteolis caducis; floribus ignotis; calycibus glabris; lobis 5, aequalibus, late ovatis vel triangularibus, circiter 1 mm. longis, acutis vel obtusis, margine subciliatis; disco cyathiformi, lobulato, plerumque in partibus medianis glandulis 5 distinctis induratis disciformibus praedito, lobis 5, obtusis; ovario ovoideo, glabro; stylis 2.5 mm. longis, glabris; stigmatibus minutis, rotundatis; carpidiis suborbicularibus vel obovatis, 6–7 mm. diametro, glabris, distincte scrobiculatis, petalis ad basim haud persistentibus.

China: Yunnan, without locality, *H. T. Tsai 57182, 57267* (A), *H. T. Tsai 57328*, type (A), in 1934, without notes; Li-kiang Hsien, *C. W. Wang 71317* (A), July, 1935, alt. 2800 m., on slopes.

Distribution: China (Yunnan).

This species may be recognized by the five rather prominent disciform indurated glands arranged at regular intervals on the sides of the disc.

21. **Sabia pallida** Stapf in herb. sp. nov.

Sabia pallida Stapf (err. "Dunn") ex Anon. Acta Phytotax. Geobot. **5**: 78. 1936, *nomen nudum.*

Frutex sempervirens scandens, ramis ramulisque viridibus vel flavido-viridibus vel vetustioribus purpureo-brunneis, nitidis, teretibus, gracilibus, substriatis, glabris; perulis glabris, late ovatis, margine ciliatis; foliis oblongis, oblongo-ellipticis vel latissime oblongo-lanceolatis, 7.5–10 cm. longis, 2–4 cm. latis, acutis vel breviter acute acuminatis, basi obtusis, subrotundatis, vel late acutis, chartaceis vel submembranaceis, supra olivaceis, glabris (vel costa conspersissime pubescente), subtus cinereis, subglaucis, glabris; nervis 3–5 utrinque, gracilibus, curvato-adscendentibus, arcuato-anastomosantibus, subtus leviter elevatis, venulis laxe reticulatis, supra obscuris; petiolo 5–7 mm. longo, subglauco, glabro; inflorescentiis cymosis, 1–3 cm. longis, glabris, 3-floris; pedunculis filiformibus, 1–2.5 cm. longis; pedicellis subclavatis, circiter 5 mm. longis; bracteolis caducis; floribus atro-rubris, circiter 10 mm. diametro; calycibus glabris, lobis 5, aequalibus, ovatis, circiter 1 mm. longis, acutis vel obtusis, margine sparse ciliatis vel eciliatis; petalis 5, aequalibus, membranaceis, saepe deorsum in partibus medianis minute rubro-punctatis, plerumque late obovatis, latissime rotundatis, 4–5 mm. longis, 3.5–4 mm. latis, 7-nerviis, margine eciliatis; staminibus 5, inaequalibus; filamentis conspersissime minutissime rubro-punctatis, planis, sursum angustatis, 3–4 mm. longis, glabris; antheris minutis, ovoideis; disco tumido, ecostulato, eglanduloso, margine annulari vel obscure undulato; ovario subconico vel ovoideo, glabro; stylis circiter 4 mm. longis, glabris; stigmatibus minutis, rotundatis; carpidiis ignotis.

China: Yunnan, Mengtze, *A. Henry 10496* (A), *10529*, type (A, P, U), *10529A* (N), alt. 1800 m., scandent in forests, flowers dark red (*10529*) or greenish white (*10529A*).

Distribution: China (Yunnan).

The Henry specimens at Kew were all placed by Stapf in the *S. pallida* cover; they were previously referred to *Sabia yunnanensis* Franch., and they were also the basis of the Yunnan record of *Sabia discolor* Dunn by Merrill and Chun, Sunyatsenia **1**: 68. 1930. This species may be distinguished from *Sabia discolor* by its tumid disc, longer filaments, shorter petioles, and its 3-flowered cymes.

Sect. Odontodiscus (p. 15)

22. **Sabia japonica** Maxim. Bull. Acad. Sci. St. Pétersb. **11**: 430. 1867, Mél. Biol. **6**: 202. 1868, Bull. Soc. Nat. Moscou **54**: 7. 1879; Franch. Nouv. Arch. Mus. Hist. Nat. Paris **5**: 230. 1883; Forbes & Hemsl. Jour. Linn. Soc. Bot. **23**: 143. 1886; Makino, Futsu Shokubutsu Zufu (Icon. Comm. Pl.) **4**: *t. 290*. 1914; Makino & Nemoto, Nippon-Shokubutsu-Sôran (Fl. Jap.) ed. 2. 704. 1931; Honda, Shikisai Zuhan Zen-Shokubutsu Ziten (Concise Dict. Jap. Fl. Nat. Color) 151. *t. 563*. 1932; Murakoshi, Nai-gwai Shokubutsu Genshoku Dai Dzukan (Iconogr. Encyclop. Bot.) **5**: 47. no. 3187. 1935; Nemoto, Nippon-Shokubutsu-Sôran-Hoi (Fl. Jap. Suppl.) 458. 1936; Chen, Illus. Man. Chinese Trees & Shrubs. 726. *f. 1–2*. 1937; Murakoshi, Shusei Shin-Shokubutsu Zukan (Illus. Jap. Fl.) 275. *f. 1069*. 1937; Murakoshi, Genshoku Zusetsu Shokubutsu Daijiten (Compr. Bot. Illus. Dict.) 152–153. *t. 76, 3*. 1938; Terasaki, Nippon Shokubutsu Zufu Zoku-hen (Icon. Fl. Jap. Suppl. Vol.) *t. 2829*. 1938. **Fig. 1.**

Sabia Bullockii Hance, Jour. Bot. **16**: 9. 1878, **21**: 296. 1883.

Sabia sp. Rehd. & Wils. Jour. Arn. Arb. **8**: 164. 1927.

Sabia japonica Maxim. var. *spinosa* Lecomte, Bull. Soc. Bot. France **54**: 673. 1907, *in nota*.

Sabia spinosa Stapf (err. "Dunn") ex Anon. Acta Phytotax. Geobot. **5**: 78. 1936, in clavis Japonice, *nomen nudum*.

A more or less scandent, occasionally suberect, deciduous shrub, the flowers always appearing before the leaves develop, the branches brown, gray or olivaceous, glabrous, the branchlets usually subtended by stout, indurated, straight or curved, short, spine-like processes (the indurated persistent bases of old petioles); branchlets usually unarmed, sometimes with short spines subtending the leaves, olivaceous to greenish yellow, slender, flexuous, glabrous or pubescent; bud-scales glabrous, ovate, obtuse, the margin eciliate; leaves oblong-lanceolate, ovate-lanceolate or broadly ovate, 3.5–9 cm. long, 2–4.5 cm. wide, shortly acute at apex, acute to subrotund and subequal at base, subchartaceous to chartaceous, usually olivaceous and glabrous on the upper surface, paler and glabrous to sparingly pubescent beneath, the margins slightly wavy, eciliate, slightly cartilagineous and narrowly revolute; nerves 4 or 5 pairs, slender, ascending, arched-anastomosing, elevated, the veinlets distinct on both surfaces; petioles 0.5–1.5 cm. long, pubescent or sparsely pubescent, sometimes obscurely glandular; flowers axillary, solitary or in pairs, subsessile or shortly pedicellate (3–5 mm.), the pedicels usually somewhat pubescent, the subtending scales 2–4 mm. long, nearly glabrous, the fruit sometimes borne on 2–4 mm. long axes or peduncles, the pedicels in fruit thickened upward, 2–2.5 cm. long, glabrous or pubescent; flowers pale greenish yellow, about 8 mm. in diameter; calyx equally 5-lobed, glabrous or sometimes with a few hairs, the lobes suborbicular, 0.5 mm. long, subacute or obtuse, the margins ciliate; petals 5, equal, thin, obovate to broadly oblong-obovate, broadly rounded, 3–4 mm. long, 2–2.5 mm. wide, 3–5-nerved, the nerves prominent; stamens 5, unequal; filaments 2–3 mm. long, glabrous; anthers ovoid, 0.4–0.5 mm. long, extrorse; disc somewhat cup-shaped, shallowly 5-lobed, the lobes obtuse, eglandular; ovary pubescent, ovoid to conical; styles cylindric, 2.5 mm. long, glabrous; stigma minute, rounded; carpidia suborbicular or subreniform, 5 mm. in diameter, sparsely pubescent, soon becoming glabrous, distinctly scrobiculate, dark blue when fresh, without persistent petals at the base.

JAPAN: Higo, *Herb. K. Sakurai s.n.* (A); Kyushu, *E. H. Wilson 6193* (A, G, U), *Z. Tashiro s.n.* (A), *Herb. K. Sakurai s.n.* (A); Satsuma, *U. S. Nat. Herb. 1179479* (U); Nagasaki, *Maximowicz, U. S. Nat. Herb. 19425,* ISOTYPE (U). CHINA: Kiangsu, I-hsing, *K. Ling, Herb. Univ. Nanking 12400* (C, G); Hai Wei, *Ching & Tso 496* (A); Paohwashan, *W. C. Cheng 4507* (U); Bau Hwa Shan, *E. D. Merrill 11438* (N); Chekiang, Chang-hsing, *K. Ling, Herb. Univ. Nanking 12426* (C); Mo Kan Shan, *Cheo & Wilson, Herb. Univ. Nanking 12823* (C, G, N); Chang-hua Hsien, *Y. L. Keng 565, 622* (A, C); without collector, *LU. 78106* (L); Fukien, *Dunn, Herb. Hongkong 2535* (A); Ku-Dien, *H. H. Chung 8023* (A, L, N), *8043* (A, L, N); Kwangtung, Tan Ha Shan, *K. P. To, CCC 2806* (P); Lung Tau Shan, *To, Tsang & Tsang, CCC 12787, 12847* (C, U); Kwangsi, Hang On-yuen, *T. S. Tsoong* (= Z. S. Chung) *81700* (A); Ta-chiang-yuen Village and vicinity, *W. T. Tsang 28146* (A); Hunan, Chang-ming Hsien, *C. S. Fan & Y. Y. Li 82* (A, B); Ping Tou Shan, *W. T. Tsang 23657* (A, U); Kiangsi, Siangtontou, Ling-shan, *Y. Tsiang 9952* (N); Oo Chi Shan, *S. K. Lau 4464* (A, U); Sui Chuen, *H. H. Hu 869* (A, P); Anhwei, Kimen, *Herb. Univ. Nanking 7825* (C); without locality, *K. K. Tsoong 3294 in part* (P) and *Herb. Univ. Nanking 1590* (P); Ningpo, *E. Faber s.n. in part* (N).

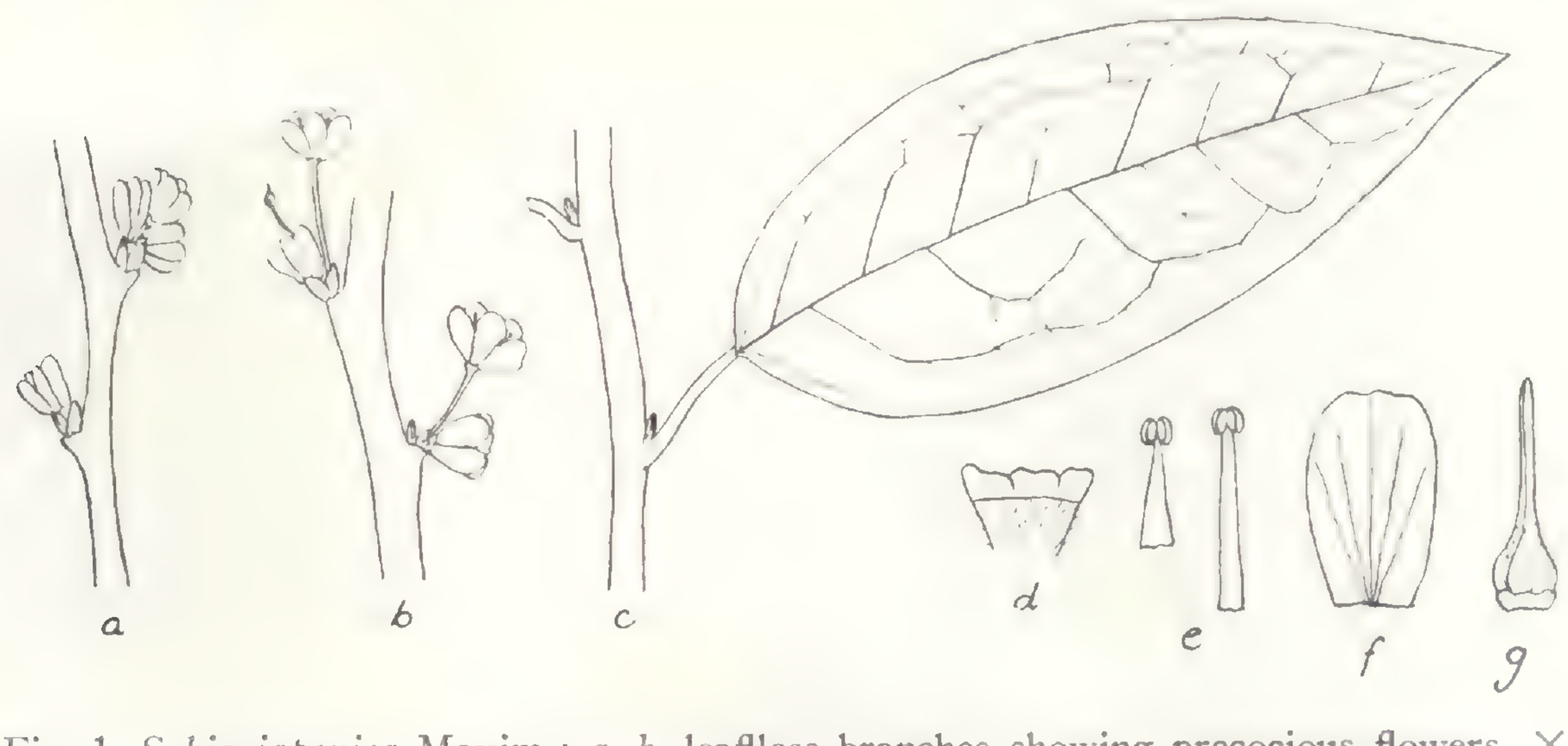

Fig. 1. *Sabia japonica* Maxim.; *a, b,* leafless branches showing precocious flowers, × 1; *c,* a branch with a mature leaf, × 1; *d,* calyx, *e,* stamens, *f,* petal, and *g,* ovary, style and disc, all × 5.

DISTRIBUTION: Japan, China (Kiangsu, Chekiang, Fukien, Kwangtung, Kwangsi, Hunan, Kiangsi, Anhwei).

This species is characterized by being deciduous, the solitary or paired flowers appearing with the young leaves or before they develop, and by the spine-like thickened processes at the bases of many of the young branches and sometimes below leafless nodes. Of all the known species of the genus *Sabia,* this is the commonest and the most widely distributed one in eastern Asia, extending from Higo in Japan to Kiangsu, Chekiang, Fukien, Kwangtung, Kwangsi, Hunan, Kiangsi, and Anhwei in China. As is to be expected of any wide-ranging species, there is some variation in pubescence of both leaves and floral parts and in the size and shape of the leaves, but since I have not found any constant characters in the material at hand for separating specimens from different regions, I believe that only a single species is represented. Léveillé, Cat. Pl. Yun-Nan 250. 1917, records the species from Yunnan, but it is believed that this record was based on an erroneously identified specimen. This is the only spiny species in the genus, and Stapf had separated certain Chinese specimens in the Kew herbarium under *Sabia japonica* Maxim. var. *spinosa* Lecomte, Bull. Soc. Bot. France **54**: 673. 1907; he merely wrote the name "*spinosa*" on the cover, but

wrote no names on any of the herbarium sheets, and this binomial, erroneously credited to Dunn, was published in the Japanese key, Acta Phytotax. Geobot. **5**: 78. 1936. The contents of this cover are *Oldham 568,* Nagasaki, *E. H. Wilson 6193,* Kyushu, *E. H. Wilson* (Veitch Exped.) *53,* Nanto, *Fortune 7,* from "China," *Shearer s.n.,* Hankow, *Evrard s.n.,* Ningpo, and *Bullock 140,* Lushan, Kukiang. I would call special attention to the fact that an isotype of Maximowicz's species, from Nagasaki, Japan, in 1863, has a distinctly spiny and a spineless branch on the same sheet, and the two clearly represent a single entity; Maximowicz merely did not mention the spiny character in his very short diagnosis. The spines occur chiefly on the older branches, the young branchlets being mostly spineless. After studying all of the material I have above listed under *Sabia japonica* Maxim., I am of the opinion that only a single species is represented, although unfortunately I have seen but a single sheet with flowers from China.

22a. **Sabia japonica** Maxim. var. **sinensis** (Stapf) stat. nov.

Sabia sinensis Stapf (err. "Dunn") ex Anon. Acta Phytotax. Geobot. **5**: 78. 1936, in clavis Japonice, *nomen nudum.*

A typo differt pedunculis glabris vel glabrescentibus; ovario glabro.

CHINA: Kwangtung, North River Region, *Tutcher 10862A,* TYPE (K, photo. A), April, 1911; Lok Chiong, *C. L. Tso 20930* (A, N), June 3, 1929; Yang Shan and vicinity, *T. M. Tsui 679* (A, B, C, N, P, U), July to September, 1932; Man Chi Shan, near the Kwangtung-Kiangsi-Hunan borders, *W. T. Tsang 26254* (A); Kiangsi, Sai Hang Cheung, *S. K. Lau 4152* (A, U).

DISTRIBUTION: China (NW. Kwangtung, SW. Kiangsi).

The specimens from northwestern Kwangtung and southwestern Kiangsi differ from those from the coastal and southeastern part of Kwangtung in their glabrate to glabrous peduncles and the glabrous ovaries. Since the differences are only those of degree, it seems advisable to consider this merely as a variety. Stapf had indicated this entity in herb. Kew as a species, *Sabia sinensis* Stapf, there being three sheets in the cover, *Tutcher 10862A* and *Henry 5421C* and *6022,* of which only the first seems to agree with Stapf's key character, "blades subacuminate, not very acute." The last two I refer to *Sabia gaultheriifolia* Stapf, and I interpret the Tutcher specimen as the actual type of *S. sinensis* Stapf. None of the sheets was named by Stapf, the specific name being merely written on the specimen cover. It is believed that the Henry specimens were included in the cover because it was thought that they were nearer *S. sinensis* than any other species.

23. **Sabia racemosa** sp. nov. **Fig. 2.**

Frutex sempervirens scandens, ramis pallide brunneis, teretibus, leviter striatis, glabris vel obscurissime sparse pubescentibus; perulis pubescentibus, late ovatis, margine ciliatis; foliis late ellipticis, elliptico-ovatis, vel oblongis, 9.5–15 cm. longis, 4–8 cm. latis, brevissime acuminatis vel acutis, basi late acutis vel subrotundatis, firme chartaceis vel subcoriaceis, supra olivaceis, subnitidis, glabris, subtus subopacis, utrinque concoloribus vel subtus paullo pallidioribus, margine cartilagineis, anguste revolutis, subundulatis, eciliatis; nervis 5–7 utrinque, curvatis, arcuato-anastomosantibus, supra subimpressis, haud perspicuis, subtus elevatis, perspicuis, venulis laxe reticulatis, distinctis; petiolo 1–1.5 cm. longo, crasso, glabro vel subglabro; inflorescentiis axillaribus, simpliciter racemosis, 3–5 cm. longis; racemis solitariis vel fasciculatis, sparse pubescentibus; floribus numerosis, stricte racemosim dispositis, circiter 8 mm. diametro, pedicellis brevibus, 1–2 mm. longis, bracteolis caducis vel nullis; calycibus sparse pubescentibus,

lobis 5, aequalibus, ovatis vel triangularibus, circiter 0.2 mm. longis, acutis; petalis 5 vel 6, aequalibus, membranaceis, ovato-lanceolatis, circiter 5 mm. longis, 2 mm. latis, 5-nerviis, nervis rubris, distinctis, sursum longe angustatis, acutis vel acuminatis, margine eciliatis; staminibus 5 vel 6, aequalibus; filamentis complanatis, 1 mm. longis, glabris; antheris oblongis, 0.5 mm. longis, introrsis; disco cyathiformi, distincte lobato, lobis 5, acutis vel obtusis, glandulis induratis nullis; ovario ovoideo, glabro; stylis 0.5 mm. longis, glabris; stigmatibus minutis, rotundatis; carpidiis obovatis, subcompressis, scrobiculatis, latissime rotundatis, basi inaequilateraliter subacutis, circiter 1 cm. longis; carpidiis albidis vel roseis, inaequilateraliter obovoideis, leviter compressis, apice rotundatis, 10–12 mm. longis, 8–10 mm. latis, leviter scrobiculatis, petalis ad basim haud persistentibus.

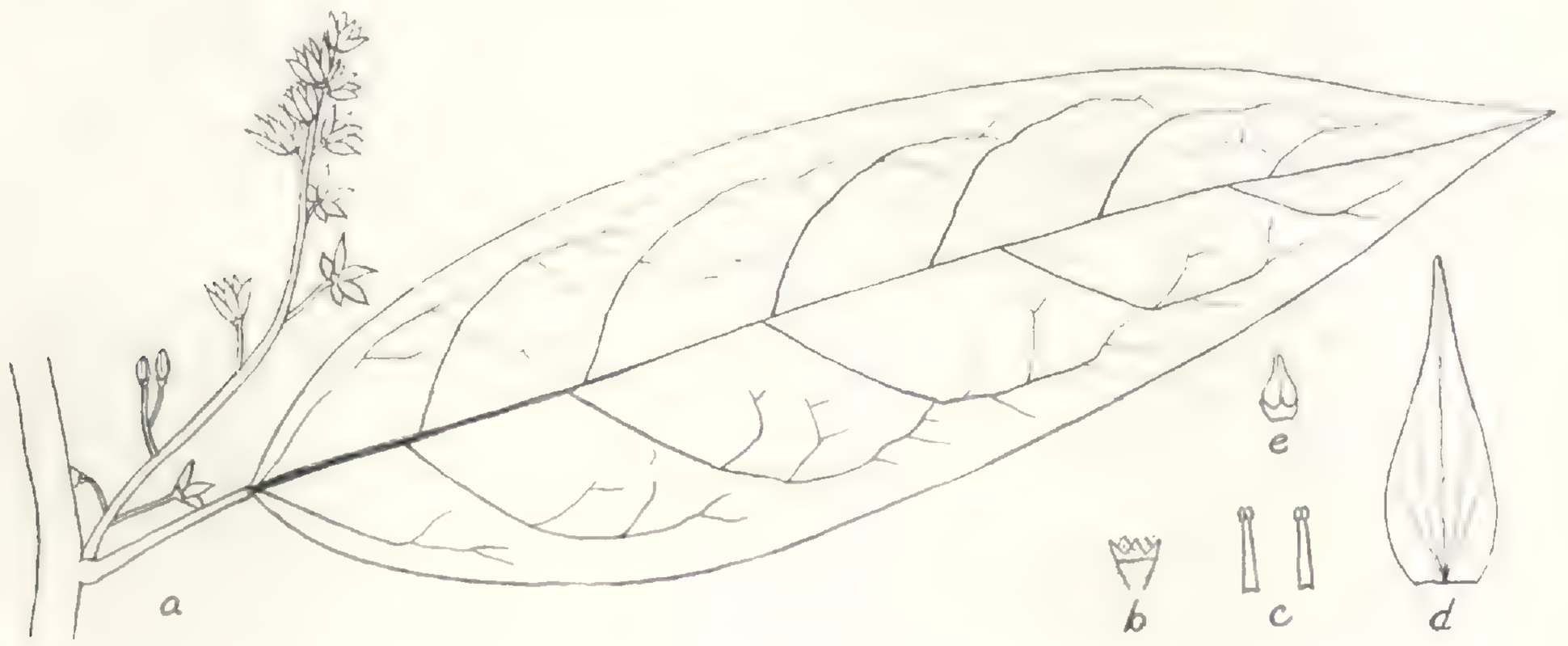

Fig. 2. *Sabia racemosa* Chen; *a*, a branch with leaf and raceme, × 1; *b*, calyx, *c*, stamens, *d*, petal, *e*, ovary, style and disc, all × 5.

BORNEO: Southeastern Borneo, between Puimam and Salinahu, *Hubert Winkler 2948* (B) (*Herb. Hort. Bot. Bog. 940–5–78*), TYPE, July 13, 1908; without notes, "N. Borneo" Oeloe Seboekoe, *Amdjah 484* (B) (*Herb. Hort. Bot. Bog. 940–5–8* and as "883 Herb. Hort. Bot. Bog.," originally named by H. Hallier as "*Sabia* sp." and probably from the Nieuwenhuis Expedition collections of 1893–1894, although at the bottom of the original label is written "a. 1912"; British North Borneo, Mount Kinabalu, Dallas, Tenompok, and Penibukan, *J. & M. S. Clemens 26192* (A, B), *30373* (A), *30374* (B), *30375* (B), *30631* (A, B, C), *32102* (B), Jan.–March, and Nov., 1932–33, alt. 900–1500 m., fruit white to pink.

DISTRIBUTION: Borneo.

This is characterized by its many-flowered simple racemes, racemose flowers being a most unusual character in *Sabia*. The racemes are axillary and solitary or several in each axil. The flowers are rather numerous, sometimes somewhat crowded, while the ovate-lanceolate petals, 5 or 6 in number, are strongly narrowed upward to the acuminate tips. The short stamens are isomerous with the petals, but the sepals seem to be five only. In facies this species suggests *Sabia javanica* (Bl.) Backer, but its inflorescences are very different and it is totally different in its floral details.

24. **Sabia campanulata** Wall. in Roxb. Fl. Ind. **2**: 311. 1824; Spreng. Syst. Veg. **4**(2): Cur. Post. 91. 1827; Dietr. Syn. Pl. **1**: 804. 1839; Hook. f. and Th. Fl. Ind. **1**: 209. 1855; Walp. Ann. Bot. Syst. **4**: 138. 1857; Brandis, For. Fl. N.-W. Centr. Ind. 116. 1874; Hook. f. Fl. Brit. Ind. **2**: 1. 1879; Kanj. For. Fl. School Circ. N. W. Prov. 93. 1901, For. Fl. Siwalik Jaunsar United Prov. 121. 1911; Collett, Fl. Simlensis 101. 1921; Bamber, Pl. Punjab 607. 1916; Parker, For. Fl. Punjab 108. 1924; Osmaston, For. Fl. Kumaon 131. 1927.

A glabrous scandent deciduous shrub, the elongated branches and branchlets terete, striate, pale green or the older ones dark purple, the flowers appearing with the young leaves; buds ovate or lanceolate, glabrous, or the margins of the scales very shortly ciliate; young leaves subfasciculate, the mature ones oblong-lanceolate or narrowly elliptic-ovate, 4.5–12 cm. long, 2–3.5 cm. wide, mostly slenderly and sharply acuminate, acute at base, membranaceous to subchartaceous, green, somewhat paler beneath, the margins very narrowly subscarious-cartilagineous, glabrous or the very young ones slightly pubescent; primary nerves 3 or 4 on each side of the midrib, distinct, curved-anastomosing, elevated beneath, the secondary ones laxly reticulate; petioles 0.5–1 cm. long; flowers axillary, solitary or sometimes 2 or 3 together appearing with the young leaves, mostly reddish purple to purplish green, their pedicels slender, 5–8 mm. long, in fruit somewhat thickened upward and 1.5–4 cm. long; calyx equally 5-lobed, glabrous, the lobes ovate, 0.5 mm. long, obtuse, eciliate; petals 5, sometimes 4, equal or somewhat unequal, purple or greenish-purple, obovate, very broadly rounded, 7-nerved, eciliate, at full anthesis 4–5 mm. long and 3–4 mm. wide, sometimes persistent and increasing in size and up to 8 or even 10 mm. long as the fruits develop and then greenish; stamens 5, the filaments slightly unequal, flattened below, narrowed upward, 3–4 mm. long, glabrous; anthers ovoid, introrse; disc cup-shaped, slightly undulate-lobed, not ribbed, the indurated glands none; ovary ovoid, glabrous; style 2.5–3 mm. long, glabrous; carpidia suborbicular or broadly obovate, somewhat compressed, when fresh blue and apparently somewhat fleshy, 6–8 mm. in diameter, when dry distinctly scrobiculate, the petals subpersistent or not, when persisting then more or less accrescent and greenish.

India: Kashmir, below Aliabad, Poonch, *R. R. Stewart 12099* (N), April, 1931, alt. about 1800 m.; near Ramban, Jumu-Kashmir Road, *R. R. Stewart s.n.* (N), Sept., 1929, alt. 900 m.; Punjab, Dharmsala, *R. R. Stewart 2026* (N), May 26, 1917, alt. 1400 m.; Kajear to Chamba, *R. R. Stewart 2258* (A), sterile and with numerous lateral galls; Chamba, Kainthili Reserve, Perganna Chuari, and Chadbaint, Bhandal Valley, *R. N. Parker s.n.* (A), in flower, April 5, 1920, and just beyond anthesis, May 24, 1919, alt. 1900–2400 m.; Kulu, *W. Koelz 1470* (N), July 5, 1930, alt. 2300 m., *1775* (A, N, U), April 2, 1931, in pine forests, alt. 1800 m.; Simla District, *J. D. Drummond 2023, 21451* (C), *R. N. Parker s.n.* (A), June, 1908, alt. 2700 m., *T. Thomson s.n.* (G); Bhali, *R. N. Parker 3055* (A, C), June 15, 1928; United Provinces, Chakrata, *I. A. Qureshi 28* (C), in flower in April, in fruit in June; Mussourie, *R. R. Stewart 13112* (A), May, 1931, alt. 1950 m.; Kumaon, *Strachey & Winterbottom 1, 3* (G); Nepal, Doti District, *Bis Ram 364* (N), May 9, 1929, a climbing shrub; Sikkim, *J. D. Hooker s.n.* (C), alt. 2400–3000 m.

Distribution: India (Kashmir to Sikkim and Nepal).

The type of this species is *Wallich 1002* from Nepal, which I have not seen. When I first studied this assemblage I segregated the cited specimens as representing a distinct species, because Wallich originally described the petals as green and nearly half an inch long. In all the specimens I have examined I note no petals that exceed 5 mm. in length, and in all this material the flowers are distinctly purple, not green. I defer to the judgment of Mr. I. H. Burkill, who examined all the material at Kew, including Wallich's type number. He states that there are two Wallich sheets at Kew, one no. 1002A, the other no. 1002B; one of these bears a supplementary label indicating it as collected by Blinkworth in Kumaon. Assuming that the other is the Sheopore specimen, this shows what is needed, two twigs with very young leaves bearing purplish flowers with petals 4–5 mm. long, and a third twig with mature leaves and old flowers 10 mm. long. The petals persist and do not fall until the fruit matures. In none of the material that I have examined do the petals exceed 5 mm. in length, and although a number of collections bear fruit in various stages of development, there are no specimens with either persistent or accrescent petals represented.

25. **Sabia sumatrana** Blume, Mus. Bot. Ludg.-Bat. **1**: 370. 1851; Miq. Fl. Ind. Bat. **1**(2): 619. 1859, Illus. Fl. Archip. Ind. 72. 1870. *t. 33.* 1871; King, Jour. As. Soc. Bengal **65**(2): 454. 1896 (Mater. Fl. Malay. Pen. **2**: 740); Ridley, Fl. Malay Pen. **1**: 513. 1922.

An evergreen scandent shrub, the branches and branchlets brownish, terete, striate, glabrous; bud-scales lacking on all specimens examined; leaves ovate-lanceolate to elliptic or oblong-elliptic, 7–19 cm. long, 4–8 cm. wide, acute to slightly acuminate, acute to rounded at base, chartaceous, olivaceous to brownish olivaceous when dry, slightly paler beneath, glabrous on both surfaces, the margins eciliate, very narrowly revolute; nerves 5–7 pairs, strongly elevated and arched-anastomosing beneath, the reticulations rather lax and distinct or prominent beneath, somewhat obscure above; petioles 1–2.5 cm. long, somewhat wrinkled, glabrous; flowers axillary, solitary, white, 5-merous, their pedicels 1–1.5 cm. long, glabrous, rather stout in fruit; calyx equally 5-lobed, the lobes slightly pubescent, ovate, 1–1.5 mm. long, acute or obtuse, the margins ciliate; petals 5, oblong to oblong-lanceolate, 6–8 mm. long, 1–1.5 mm. wide, 5-nerved, acuminate, the margins eciliate; stamens 5, equal; filaments complanate, slightly swollen at apex, 3–4 mm. long, glabrous; anthers oblong, about 1 mm. long, introrse; disc somewhat cup-shaped, irregularly shallowly lobed, lobes 5, without indurated glands; ovary ovoid, glabrous; styles 4 mm. long, glabrous; stigmas minute, rounded; carpidia somewhat compressed, obovate to ovoid, about 10 mm. long and 8 mm. wide, glabrous, scrobiculate, without persistent petals at base, when fresh, blue with dark spots (King's collector says, "fruit white, blue spotted," and Ridley repeats this).

SUMATRA: Without locality, *Korthals s.n.* (B); East Coast, Asahan, vicinity of Hoeta Bagasan, *R. S. Boeea 7127* (A, U), Sept., 1934 to Feb., 1935. MALAY PENINSULA: Perak, *King's collector 2217* (U), alt. 550 m., *Scortechini, U. S. Nat. Herb. no. 282062* (U), alt. 900 m.

DISTRIBUTION: Sumatra, Malay Peninsula.

This species is recognized by its unusually long (6–7 mm.) narrowly lanceolate petals, its axillary solitary flowers, and its prominently nerved reasonably ample leaves. The Korthals specimen cited is probably an isotype; Blume cited no collector, merely stating: "In Sumatra." Miquel's excellent plate was doubtless based on the type collection.

26. **Sabia leptandra** Hook. f. & Th. Fl. Ind. **1**: 209. 1855; Walp. Ann. Bot. **4**: 138. 1857; Hook. f. Fl. Brit. Ind. **2**: 22. 1879.

Apparently a deciduous, scandent or subscandent shrub, the branches and branchlets terete, striate, glabrous; leaves oblong to ovate or elliptic-ovate, the smaller ones 3–8 cm. long and 1.5–3 cm. wide, the larger ones 11–16 cm. long and 4.5–7.5 cm. wide, acuminate, the base broadly acute to rounded, the younger ones membranaceous to subchartaceous, the mature larger ones subcoriaceous, glabrous on both surfaces, olivaceous to brown on the upper surface, pale beneath, the margins eciliate, slightly cartilagineous and revolute; nerves about 4 pairs, curved-ascending, anastomosing, prominently elevated on the lower surface, the secondary veins and lax reticulations distinct in the mature leaves, not so prominent in immature ones; petioles 5–8 mm. long on immature leaves, 1–1.8 cm. long on mature ones, glabrous; flowers axillary, solitary, the slender filiform pedicels 1.5–2 cm. long, in fruit slightly thickened upward and up to 2.5 cm. long; flowers 5-merous, greenish purple; calyx 5-lobed, glabrous, the lobes ovate or rounded, 0.4 mm. long, obtuse, the margins eciliate; petals 5, equal, thin, narrowly oblong-ovate, somewhat narrowed upward, at least 5–6 mm. long (about 8 mm. fide Hooker f. and Thomson), 2–2.5 mm. wide, obtuse, the margins eciliate; stamens 5, equal, the filaments linear, about 5 mm. long; anthers somewhat ovoid, 0.8 mm. long; disc cup-shaped, irregularly or regularly 5-lobed, the

lobes obtuse, without indurated glands; ovary glabrous, conical or ovoid; styles slender, 4–5 mm. long, glabrous; stigmas minute, subcapitate; carpidia subreniform, about 5 mm. in diameter, glabrous, the scrobiculations obscure, the petals not persistent at base.

INDIA: Sikkim, *J. D. Hooker s.n.*, ISOTYPE (G), alt. 1500–2100 m., *T. Thomson s.n.* (B), in 1857, *G. King s.n.* (P), alt. 1700 m., *G. King 5105* (U), alt. 2100 m., *s.n.* (P), alt. 1500 m., *W. G. Craib 496* (P), Dec. 2, 1908, alt. 1400 m., *E. H. Wilson s.n.* (A), Sept. 10, 1921, *Herb. S. Kurz s.n.* (B), *Otto Kuntze 6830* (N), Nov. 21, 1874, alt. 1400 m., and without collector and number (B); Bhotan, Kalimpong, *C. B. Clarke 26433C* (B), Nov. 18, 1875, alt. 1400 m.

DISTRIBUTION: India (Sikkim, Bhotan).

This species is distinguished by its elongated slender stamens, the disc being irregularly or regularly deeply lobed. One might suspect that the small and large leaves which Hooker f. and Thomson described might have come from at least separate plants, but this does not seem to be the case, judging from the Hooker, one Kurz, and one King specimen I have seen, while *Craib 496* consists of leafy branches bearing the larger mature leaves and flowers and leafless branches, and one bearing also immature leaves, both bearing more or less numerous flowers. I have seen no note indicating the exact habit of the species, but it seems safely to be deciduous and at least subscandent. Otto Kuntze indicates its size as 8–10 ft.

Diels, Bot. Jahrb. **29**: 451. 1900, recorded this species with some doubt from Szechuan, on the basis of *Rosthorn 16,* stating that Rosthorn's sterile specimen from Kin Shan belonged at least in the vicinity of *Sabia leptandra* Hook. f. & Th. I have seen no material from China that I can refer to that species and believe that it must be eliminated from the Chinese list.

27. **Sabia dumicola** W. W. Smith, Notes Bot. Gard. Edinb. **10**: 63. 1917. **Fig. 3.**

A deciduous shrub, 2–6 m. high, erect or subscandent, the branches and branchlets brownish olivaceous to greenish, terete, striate, glabrous; bud-scales glabrous, ovate, the margins ciliate; leaves ovate-lanceolate to oblong-lanceolate, 3–6 cm. long, 1.5–3 cm. wide, narrowed upward, acute or acuminate, the base cuneate or rounded, the immature ones membranous, at maturity subchartaceous, glabrous on both surfaces, olivaceous on the upper surface, pale green beneath, the margins narrowly cartilagineous and eciliate; nerves 4 pairs, arcuate-anastomosing, curved, slightly elevated, the veinlets loosely reticulate, inconspicuous; petioles 3–4 mm. long, glabrous; inflorescences cymose, 1–2 cm. long, glabrous, 8–10-flowered, the flowers somewhat crowded, the flower-bearing part about 1 cm. in diameter; peduncles slender, 1 cm. long; pedicels slender, short, 3–4 mm. long; flowers olivaceous-green, greenish purple, or (fide Smith) deep dull red or crimson-maroon, about 6–8 mm. in diameter; calyx unequally lobed, glabrous, the lobes 5, lanceolate or oblong, 0.5–2 mm. long, 0.5–1 mm. wide, obtuse to acute, sometimes slightly crenulate, the margins eciliate; petals 5, equal, thin, elliptic or ovate, 3–4 mm. long, 1.5–2.5 mm. wide, 5-nerved, obtuse or rounded, the margin eciliate; stamens 5, unequal; filaments short, somewhat flat, widened below and minutely gibbous at the tips, 5–10 mm. long, glabrous; anthers minute, oblong, 0.5 mm. long, extrorse; disc cup-shaped, irregularly deeply lobed, the lobes somewhat fleshy, each conspicuously tipped by a small disciform indurated gland; ovary conical, glabrous; style short, 0.5 mm. long, glabrous; stigma minute, somewhat rounded; carpidia inequilaterally obovate, about 7 mm. long, glabrous, with obscure scrobiculations, with or without persistent petals at the base.

CHINA: Yunnan, Tengyueh, *G. Forrest 9569,* iso-syntype (A), *9717,* iso-syntype (A, photo. N), alt. 1800–2100 m., Feb. and March, 1913; Shweli-Salwin divide, *G. Forrest 21091*

(A, photo. N), March, 1922, alt. 2100–2400 m.; Shun-Ning Hsien, *C. W. Wang 71939* (A), Feb., 1936, alt. 2700 m.; Chan-Kang Hsien, *C. W. Wang 72476, 72531* (A), March, 1936, alt. 2000–2400 m.; Lung-ling Hsien, *H. T. Tsai 55528* (A), March 21, 1934, alt. 1700 m.; without locality, *G. Forrest 8469* (A).

DISTRIBUTION: China (Yunnan).

This species is recognizable by its distinctly unequal, lanceolate or oblong, acute or obtuse calyx-lobes, which are 1–2.5 mm. long, and 0.5–1 mm. wide, its somewhat crowded flowers, its short filaments, and by its distinct disc-lobes being tipped by a small indurated gland.

Fig. 3. *Sabia dumicola* W. W. Smith; *a,* a flowering branch, × 1; *b,* calyx, *c,* petal, *d,* stamens, *e,* ovary, style and disc, all × 5.

28. **Sabia heterosepala** sp. nov.

Frutex sempervirens, scandens, ramis olivaceo-brunneis vel purpureo-brunneis, teretibus, lenticellatis, glabris; ramulis pallide flavido-viridibus, teretibus, striatis, glabris; perulis glabris, late ovatis, margine eciliatis; foliis membranaceis, olivaceis, ellipticis vel oblongo-ellipticis, 6–9 cm. longis, 2.5–4 cm. latis, acutis vel acuminatis, plerumque breviter apiculatis, basi late acutis vel subrotundatis, utrinque glabris vel junioribus parcissime pubescentibus, margine anguste scarioso-subcartilagineis, eciliatis; nervis 4 vel 5 utrinque, curvato-adscendentibus, arcuato-anastomosantibus, gracilibus, subtus leviter elevatis, venulis laxe reticulatis distinctis, supra obscuris; petiolo 5–10 mm. longo, glabro; inflorescentiis axillaribus solitariis, circiter 2 cm. longis, glabris, 2-floris; pedunculis circiter 1.2 cm. longis; pedicellis 5 mm. longis, bracteolis caducis; floribus albido-viridibus, 8–10 mm. diametro; calycibus glabris, lobis 5, inaequalibus, 3 majoribus, 2 paullo minoribus, membranaceis, oblongis, 1.5–3 mm. longis, 0.5–1.5 mm. latis, rotundatis, circiter 4- vel 5-nerviis, margine eciliatis; petalis 5, aequalibus, membranaceis, obovatis, late rotundatis, 5–5.5 mm. longis, 3–3.5 mm. latis, 7-nerviis, margine eciliatis; staminibus 5, inaequalibus; filamentis complanatis, 3–4 mm. longis, glabris; antheris ovoideis, 1 mm. longis; disco subcyathiformi inaequaliter breviterque lobato, lobis parvis, obtusis, glandulis induratis nullis; ovario ovoideo, glabro; stylis glabris, 4.5 mm. longis, crassis; stigmatibus minutis, rotundatis; carpidiis ignotis.

CHINA: Hunan, Yun-schan near Wukang, *Handel-Mazzetti 87* (col. *Wang Te-Hui*), TYPE (A), April, 1919, alt. between 400 and 1420 m.

DISTRIBUTION: China (Hunan).

In its unusually large, thin, very unequal sepals this suggests *Sabia emarginata* Lecomte, as the cited specimen was originally named by Handel-Mazzetti. I am convinced that it is not the same as Lecomte's species, as a representative of the section *Odontodiscus* is indicated. None of the sepals are emarginate.

29. **Sabia fasciculata** Lecomte in herb. sp. nov. **Fig. 4.**

Sabia fasciculata Lecomte (err. "Dunn") ex Anon. Acta Phytotax. Geobot. **5**: 77. 1936, in clavis Japonice, *nomen nudum;* Merr. Brittonia **4**: 111. 1941, *nomen nudum.*

Frutex sempervirens, scandens, ramis ramulisque plerumque brunneis vel atro-brunneis, teretibus, gracilibus, striatis, glabris; perulis glabris, late ovatis, margine eciliatis; foliis oblongis, oblongo-ellipticis vel late oblongo-lanceolatis, 6–11 (rariter ad 13) cm. longis, 1.5–3.5 cm. latis, distincte et plerumque acute acuminatis, basi acutis vel subrotundatis, coriaceis, utrinque glabris, supra pallide viridibus vel olivaceis, opacis vel subnitidis, subtus paullo pallidioribus, margine cartilagineis, eciliatis, anguste revolutis; nervis 6–8 utrinque, subpatulis, arcuato-anastomosantibus, supra obscuris, subtus elevatis, distinctis, venulis manifestis; petiolo 1–1.3 cm. longo, glabro vel aliquando sparse pubescente; inflorescentiis axillaribus, solitariis e basi ramosis, junioribus (sub alabastro) glomerulo simulantibus, sub anthesi apertis, 2–4 cm. longis, e basi ramosis, 10–20-floris; ramis primariis 4–10 mm. longis, plus minusve racemosim dispositis singulis umbellato-cymosis 3- vel 4-floris; pedicellis gracilibus, 3–6 mm. longis; floribus viridibus, 8 mm. diametro; calycibus glabris, glandulis rubris obscurissimis minutissimis praeditis, lobis 5, aequalibus, ovatis vel oblongo-ovatis, 1–2 mm. longis, acutis vel late obtusis, margine ciliatis; petalis 5, aequalibus, oblongo-ovatis vel late oblongo-lanceolatis, circiter 5 mm. longis et 2 mm. latis, 7-nerviis, sursum leviter angustatis, obtusis, margine eciliatis; staminibus 5, inaequalibus; filamentis complanatis, 2.5–4 mm. longis, glabris; antheris oblongis, circiter 1 mm. longis, extrorsis; disco cyathiformi, lobulato, glandulis induratis nullis, lobis 5, obtusis; ovario conico, glabro; stylis 2.5 mm. longis, glabris; stigmatibus minutis, rotundatis; carpidiis rubris, obovatis, circiter 8 mm. longis, glabris, scrobiculatis, petalis ad basim haud persistentibus.

CHINA: Yunnan, southeast of Mengtze, *A. Henry 10487,* TYPE (A, N, photo. N), alt. 1500 m., in mountain forests, flowers green; Ping-pien Hsien, *H. T. Tsai 55103* (A), alt. 1400 m., May 16, 1934, alt. 1400 m., in ravine, climbing shrub, fruit red, *H. T. Tsai 60613, 60821* (A), alt. 1300–1400 m., July 2, 1934; Wen-shan Hsien, *H. T. Tsai 51629, 51660, 51695, 51755* (A), Jan.–Feb., 1933, alt. 1800–1900 m.; Ma-kwan Hsien, *H. T. Tsai 51904* (A), March 2, 1933, alt. 1700 m.; without locality, *H. T. Tsai 57017, G. Forrest 17799* (A, photo. N); Kwangsi, Chu Feng Shan, Luchen, *R. C. Ching 5792* (N), June 7, 1928, alt. 520 m.; Yao-shan, *C. Wang 39425, 40326* (A), June 18 and Oct. 29, 1936; Ling Wan District, *S. K. Lau 28443* (A), June 19, 1937; Kwangtung, Lok Chong, *C. L. Tso 21068* (N), June 11, 1929. INDO-CHINA: Tonkin, Chapa, *A. Pételot 4531* (N, U), Feb., 1932, alt. 1400–1500 m. UPPER BURMA: Mountain nullas, south of Htawgaw, *F. K. Ward 376* (A), March 9, 1939, alt. 1500 m.

DISTRIBUTION: China (Yunnan, Kwangsi, Kwangtung), Indo-China, Upper Burma.

The basis of the specific name is a specimen in the Kew Herbarium (photo. N) bearing the binomial "*Sabia fasciculata* Lecomte." The axillary cymes, when very young, are actually glomerate-fasciculate, but they elongate and at full anthesis are open and up to 3.5–4 cm. long, there being no peduncle, or at most a very short one, the inflorescences being solitary, branched from the base, and with a few racemosely arranged branches along the short rachis. As the name "fasciculata" is a rather inappropriate one, because the flowers are in no sense fascicled, I should have ignored it but for the fact that it was originally used in

the anonymous Japanese key above cited. In selecting the name, Lecomte was misled by the young inflorescences on specimens of *Henry 10487* that, in bud, appear as rather dense glomerules. This type of inflorescence, i.e., one branched from the base, the few branches more or less racemosely arranged, forming what may be termed a racemose-cymose inflorescence, is distinctly unusual in *Sabia*.

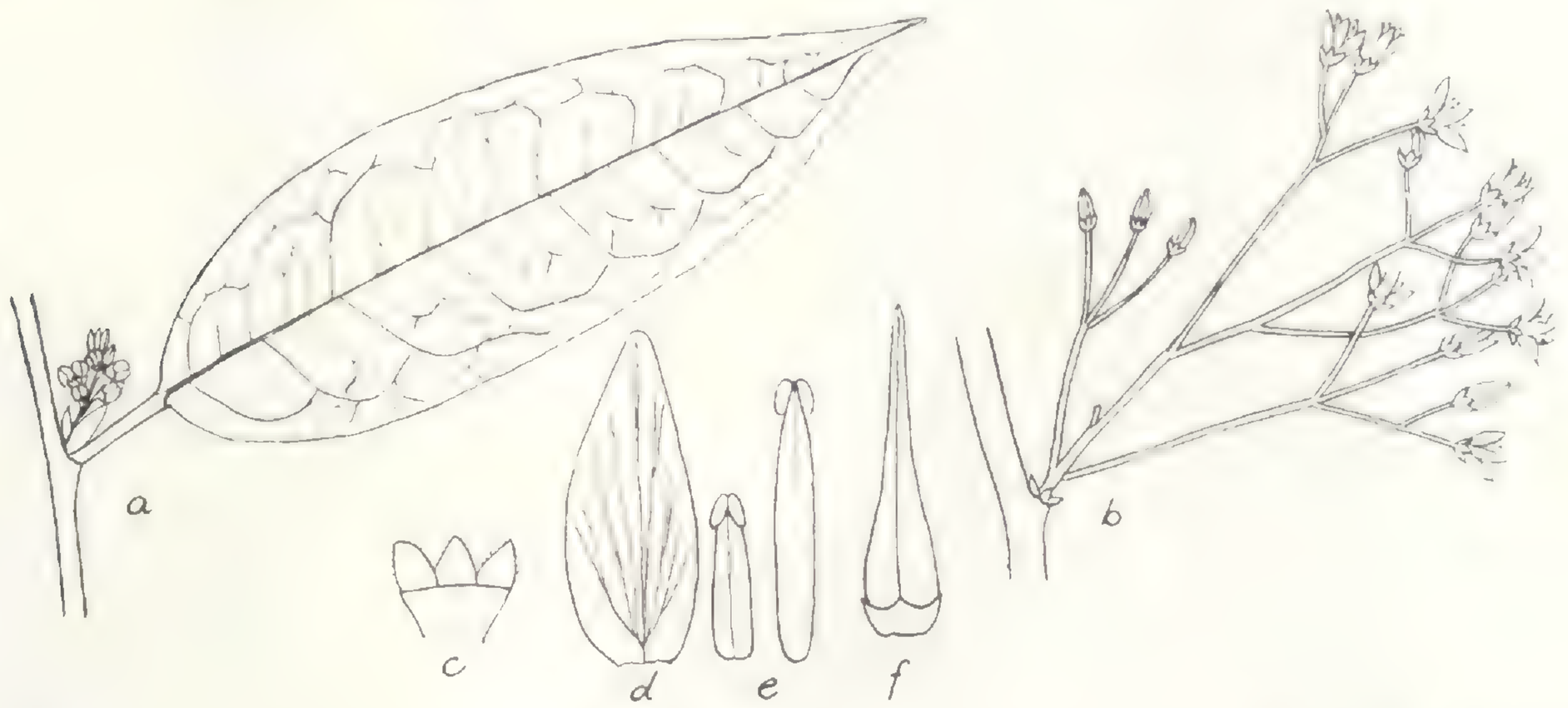

Fig. 4. *Sabia fasciculata* Lecomte; *a*, a branch with one leaf and a juvenile inflorescence, × 1; *b*, a mature inflorescence, × 1; *c*, calyx, *d*, petal, *e*, stamens, *f*, ovary, style and disc, all × 5.

30. **Sabia gracilis** Hemsl. in Hook. Ic. **29**: *t. 2831.* 1907; Fedde, Repert. Sp. Nov. **5**: 339. 1908; Rehd. & Wils. in Sargent, Pl. Wils. **2**: 198. 1914; Rehd. Jour. Arn. Arb. **15**: 9. 1934.

An evergreen, small, much-branched, suberect shrub, the branches and branchlets olivaceous or brown, slender, terete, silvery-gray- or blackish-tomentose; bud-scales sparsely pubescent or glabrous, ovate, the margins eciliate; leaves lanceolate or oblong-lanceolate, 2–7 cm. long, 1–1.5 cm. wide, rarely somewhat wider, shortly acuminate or acute, apiculate, cuneate to broadly acute at base, subcoriaceous, pale green, glabrous on the upper surface except for the conspicuously pubescent midrib paler and sparsely villose beneath, becoming glabrate with age, the margins narrowly cartilagineous, slightly undulate, eciliate; nerves 4–6 pairs, slender, arched-anastomosing, obscure above, slightly elevated beneath, the veinlets obscure above and not very prominent beneath; petioles 3–4 mm. long, slender, densely pubescent; inflorescences shortly cymose, 1–1.5 cm. long, silvery-grayish-pubescent, 2–4-flowered; peduncles slender, 4–6 mm. long; pedicels 1–2 mm. long; bracteoles pubescent, linear, 0.5–1 mm. long; flowers white or greenish white, 6–8 mm. in diameter; calyx equally 5-lobed, pubescent, becoming glabrate, the lobes ovate-lanceolate, 1 mm. long, acute, the margins ciliate; petals 5, equal, thin, lanceolate or oblong-lanceolate, 3–4 mm. long, 0.5–1 mm. wide, 5-nerved, the tips obtuse or subacute, sometimes incurved; stamens 5, equal; filaments somewhat clavate, about 1 mm. long, glabrous; anthers ovoid, 0.2 mm. long, introrse; disc somewhat cup-shaped, irregularly and shallowly lobed, the lobes 5, obtuse, without indurated glands; ovary conical or ovoid, glabrous; styles 0.5 mm. long, glabrous; stigmas minute, rounded; carpidia blue, suborbicular or subreniform, 6–7 mm. in diameter, glabrous, slightly scrobiculate, without persistent petals at the base.

CHINA: Szechuan, Mount Omei, *E. H. Wilson 4806* (Veitch Exped.), ISOTYPE (A, photo. of type N), July, 1904, *T. T. Yü 253* (A), Apr. 14, 1932, alt. 700 m., *W. P. Fang 7593* (A), July 15, 1930; Kuan Hsien, *E. H. Wilson 2532* (A, U), July 17, 1908, alt. 900

m.; O-pien Hsien, *T. T. Yü 837* (A), May 23, 1932, alt. 1150 m.; Kikiang Hsien, *W. P. Fang 1327* (A), June 11, 1928, alt. 1050–1350 m.; Kweichow, Tungtze, *Y. Tsiang 5072* (A, U), May 26, 1930, alt. 450 m.; Keying-ten-shan, *Y. Tsiang 5306* (N), June 5, 1930, alt. 400 m.; Pachai, *Y. Tsiang 6155* (C, N), July 30, 1930, alt. 500 m.

DISTRIBUTION: China (Szechuan, Kweichow).

The general habit and appearance of this species suggests the widely distributed *Sabia Swinhoei* Hemsley, the two being clearly allied. It may be distinguished by its often incurved petals and its usually smaller, lanceolate or oblong-lanceolate leaves which are more or less silvery-grayish-pubescent beneath. The description of the carpidia is added from *Tsiang 6155*.

31. **Sabia Swinhoei** Hemsl. Jour. Linn. Soc. Bot. **23**: 144. 1886; Diels, Bot. Jahrb. **29**: 451. 1900; Hayata, Icon. Pl. Form. **1**: 160. 1911; Sasaki, List Pl. Formosa 278. 1928; Makino & Nemoto, Nippon-Shokubutsu-Sôran (Fl. Jap.) ed. 2. 704. 1931; Hand.-Maz. Symb. Sin. **7**: 643. 1933; Murakoshi, Nai-gwai Shokubutsu Genshohoku Dai Dzukan (Iconogr. Encyclop. Bot.) **5**: 47. no. 3188. 1935; Nemoto, Nippon-Shokubutsu-Sôran-Hoi (Fl. Jap. Suppl.) 459. 1936.

Sabia Dunnii H. Lév. Repert. Sp. Nov. **9**: 457. 1911, syn. nov.

An evergreen climbing shrub, the branches terete, flexuous, striate, pubescent, mostly pale brownish; branchlets slender, terete, flexuous, pubescent; bud-scales glabrous, ovate, the margins sparsely ciliate; leaves oblong to oblong-elliptic or ovate-elliptic, 3–12 cm. long, 2–4 cm. wide, distinctly acuminate, acute or apiculate at apex, rarely blunt, acute to obtuse but scarcely rounded at base, chartaceous to thinly coriaceous, dark to pale brown, pubescent on the midrib, rarely pubescent on the lateral nerves on the upper surface, paler beneath and rather softly pubescent especially on the midrib and nerves, the margins cartilagineous and narrowly revolute, slightly wavy and eciliate; nerves 4–6 pairs, slender, rather spreading, arched-anastomosing, rather obscure above, strongly elevated beneath, the veinlets distinct and loosely reticulate on the lower surface, obscure above; petioles 3–5 mm. long, pubescent; inflorescences cymose, 1.5–2.5 cm. long, sparsely pubescent, 2–5-flowered; peduncles filiform, 1–1.5 cm. long; pedicels filiform but somewhat thickened upward, 2–4 mm. long; bracteoles pubescent, linear, 1–2 mm. long; flowers white, 8–10 mm. in diameter; calyx equally 5-lobed, slightly pubescent and with very obscure minute reddish glands, the lobes ovate, 1 mm. long, acute, the margins ciliate; petals 5, equal, thin, ovate-lanceolate to lanceolate, 3.5–4.5 mm. long, 1 mm. wide, strongly narrowed upward, acute or somewhat blunt, 3–5-nerved, the margins eciliate; stamens 5, equal; filaments somewhat broad, 1 mm. long, glabrous; anthers minute, subrotund, 0.5 mm. long; disc cup-shaped, shallowly lobed, the lobes 5, without indurated glands; ovary conical or ovoid, glabrous; style slender, 1 mm. long, glabrous; stigma minute, capitate; carpidia dark blue or blue-black when mature, subreniform, suborbicular, or obovate, about 8 mm. long, glabrous, distinctly scrobiculate, without persistent petals at the base.

FORMOSA: Without locality, *Swinhoe*, TYPE (photo. A, N). CHINA: Kiangsu, near Nanking, *H. Q. Fu 79* (P), in 1919; Chekiang, Chang-hua, *F. N. Meyer 1539* (A), July 10, 1915, alt. 240 m.; without locality, *S. Chen 970* (A), Apr. 10, 1933; Fukien, Kuling, *H. H. Chung 6653* (A), July, 1926, *J. B. S. Norton 1477* (P, U), July 31, 1919; Inghok Hsien, *H. H. Chung 3191* (C), Apr. 23, 1925; without locality, *Dunn, Herb. Hongk. 2533* (A); Kwangtung, Taai Yeung Shan, *McClure, CCC 6480* (N), July 20, 1921, alt. 700 m.; Naam Kwan-shan, *W. T. Tsang 20203* (A, N), *20312* (N), Apr. 11–23, 1932; Jen-hua District, Man Chi Shan, *W. T. Tsang 26232* (A), Apr. 21, 1936; Loh Fau Shan, *E. D. Merrill 10745* (P), Aug. 22, 1917, alt. 1000 m., *Levine & McClure, CCC 7006* (P), Sept. 4, 1921, alt. 800 m.; Kwangsi, Pai-shou District, *Y. W. Taam 54* (A), Aug. 20, 1937; Shap-Nan Taai Shan, *W. T. Tsang 22698* (A), July 12, 1933; Kweichow, Pin-fa, *J. Cavalerie 21 bis*, isotype of *Sabia Dunnii* H. Lév. (fragment A), Apr. 4, 1902; Kiangsi, Tunghua-shan, *Y. Tsiang 10082* (N), June 30, 1932, alt. 700 m.; Ping-hsing, *Handel-*

Mazzetti (Wang Te Hui) 130 (A), alt. 600 m.; without locality, *K. K. Tsoong 3434* (P); Hunan, Ping Tou Shan, Pai Mu Village, *W. T. Tsang 23416* (A, U), March 21, 1934; Hupeh, Near Ichang, *A. Henry 3460* (A, G), *3460A, 4181* (G, U).

DISTRIBUTION: Formosa, China (Kiangsu, Chekiang, Fukien, Kwangtung, Kwangsi, Kweichow, Kiangsi, Hunan, Hupeh).

This species may be distinguished by its leaves being more or less pubescent beneath, usually acute at the base, and by its ovate-lanceolate petals which are strongly narrowed upward. Naturally, a wide-ranging species, such as this is according to my interpretation, shows considerable variation in the shape and size of its leaves; *Norton 1477* from Fukien has small leaves; *Tsang 20203* from Kwangtung has longer leaves up to 12 cm. in length. The larger leaves on the original Formosan type are only about 5 cm. long. Two extreme forms, one from Hainan and one from Hupeh, Chekiang, and Kwangsi, are below designated as varieties, admittedly on not very strong characters.

Sabia Dunnii H. Lév. was reduced to *Sabia gracilis* Hemsl. by Rehder, Jour. Arnold Arb. **15**: 9. 1934, but it seems to me to be more closely related to *Sabia Swinhoei* Hemsl. on account of the shape and color of its slightly pubescent leaves, the type of pubescence, and the details of its floral parts.

31a. **Sabia Swinhoei** Hemsl. var. **subcorymbosa** (Stapf) stat. nov.

Sabia subcorymbosa Stapf (err. "Dunn") ex Anon. Acta Phytotax. Geobot. **5**: 77. 1936, in clavis Japonice, *nomen nudum.*

A typo differt foliis basi rotundatis, haud acutis.

CHINA: Hupeh, Nanto, *Wilson 184* (Veitch Exped.), TYPE (K, photo. N, frustulum A), scandent, flowers yellow; Chekiang, south of Ping Yung, *R. C. Ching 2006* (A, C, L, N, U), scandent, alt. 60 m., July 5, 1924; Kwangsi, Yung Hsien, *A. N. Steward & H. C. Cheo 889* (A), Aug. 29, 1933, alt. 540 m.

DISTRIBUTION: China (Hupeh, Chekiang, Kwangsi).

Handel-Mazzetti, Symb. Sin. **7**: 643. 1933, placed *Sabia subcorymbosa* Stapf as a synonym of *Sabia Swinhoei* Hemsl. This form is manifestly very close to Hemsley's species, and like that has somewhat pubescent inflorescences and sepals. The chief difference appears to be in the shape of the leaves, which are distinctly rounded at the base, not acute. The leaves are mostly oblong-ovate and vary from 4 to 10 cm. long and 2.5 to 5 cm. wide. In characters other than the leaf-shape this variety conforms closely to *Sabia Swinhoei* Hemsl.

31b. **Sabia Swinhoei** Hemsl. var. **hainanensis** var. nov.

A typo differt foliis plerumque ovatis, basi latissime rotundatis, inflorescentiis calycibusque glabris.

CHINA: Hainan, Bak Sa, *S. K. Lau 25751,* TYPE (A), March 18, 1936, a scandent shrub in forests, flower white.

DISTRIBUTION: China (Hainan).

The leaves are very different in shape from those of the Formosan type, which are oblong and subequally narrowed to the acute or slightly acuminate tips and the acute bases. In the new variety they are 4–9 cm. long and 2–5.5 cm. wide and always very broadly rounded at the base.

32. **Sabia discolor** Dunn, Jour. Linn. Soc. Bot. **38**: 358. 1908; Merr. & Chun, Sunyatsenia **1**: 68. 1930.

An evergreen scandent shrub, the branches and branchlets grayish glaucous to dark brown, terete, slightly flexuous, striate, glabrous; bud-scales glabrous, ovate, the margins eciliate; leaves ovate to ovate-elliptic or elliptic, 4–7 cm. long, 2–3.8 cm. wide, subacute to obtuse, rounded or obtuse at base, chartaceous to subcoriaceous (or when young submembranaceous), glabrous on both surfaces,

greenish olivaceous to very dark brown or almost black on the upper surface when dry, beneath pale, glaucous, in strong contrast to the upper surface, the margins subcartilagineous, eciliate, slightly revolute; nerves 3 or 4 pairs, slender, curved-ascending, arched and joined by means of the secondary veins, elevated, the veinlets prominently and loosely reticulate on the lower surface, obscure above; petioles 0.7–1.5 cm. long, slender, glabrous; inflorescences axillary, solitary, umbellately cymose, 2–4-flowered, 2–3 cm. long, glabrous; peduncles slender, subglaucous, 1–3 cm. long; pedicels subglaucous, 4–7 mm. long; bracteoles caducous; flowers green to yellowish green, small, about 4 mm. in diameter; calyx equally 5-lobed, glabrous, the lobes ovate or triangular, 1 mm. long, acute or obtuse, the margins ciliate; petals 5, equal, thin, ovate to elliptic-ovate, 2–3 mm. long, 1.5 mm. wide, 5–7-nerved, obtuse; stamens 5, subequal; filaments 1.8–2 mm. long, glabrous; anthers oblong, 1 mm. long, extrorse; disc cup-shaped, irregularly shallowly lobed, the indurated glands none; ovary ovoid, glabrous; styles 3–4 mm. long, glabrous; stigmas minute, capitate; carpidia sub-orbicular-obovate or obovate, more or less inequilateral, pink or red, becoming blue at full maturity, 5 mm. in diameter, subglaucous, glabrous, scrobiculate, without persistent petals at the base.

China: Chekiang, Sze-tou, south of Siachi, *R. C. Ching 1722* (A, C, L, U), June 1, 1924, alt. 550 m.; Fukien, Yangping, *Dunn, Hongk. Herb. 2536,* iso-syntype (A, N), *2537,* iso-syntype (A), Apr.–June, 1905, alt. 700 m., *H. H. Chung 3276* (A, C), June 10, 1925, alt. 800 m.; Kwangtung, Tsin Leong San, *J. L. Gressitt 1249* (A), June 3, 1936, alt. 850 m.; Ting Leng Shan, *McClure, CCC 6754* (P), July 30, 1921, alt. 600 m.; Lok Chong, *C. L. Tso 20434* (N), May 11, 1929, Yaoshan, *S. S. Sin 9799* (N), Apr. 26, 1930; Wan Tong Shan, *T. M. Tsui 388* (A, N, P, U), June 6–24, 1932; Sam Kok Shan, *W. T. Tsang 20633* (A, N), May 30, 1932, *25026, 25159* (A), April–May, 1935; Tai Mo Shan, *W. T. Tsang 21223* (A, B, N, P), July 18, 1932; Kwai Shan, *W. T. Tsang 28579* (A), March 16–31, 1938; Kiangsi, Chung Yih, *H. H. Hu 946* (A, P), Apr. 20, 1921, alt. 750 m.

Distribution: China (Chekiang, Fukien, Kwangtung, Kiangsi).

This species is readily distinguished by its vegetative characters, the pale glaucous lower leaf-surface in sharp contrast to the dark colored upper surface. The leaves of *Chung 3276* and *Hu 946* are slightly less glaucous than the other specimens and are more shiny on the upper surface, but otherwise they cannot be separated from the typical form of the species. It was erroneously recorded from Yunnan by H. H. Chung, Mem. Sci. Soc. China **1**: 152. 1924, the basis of this record being *Henry 10496* and *10529,* which represent *Sabia pallida* Stapf.

33. **Sabia coriacea** Rehd. & Wils. in Sargent, Pl. Wils. **2**: 198. 1914; Chun, Sunyatsenia **1**: 266. 1934. **Fig. 5.**

An evergreen scandent shrub, about 5 m. high, the branches and branchlets dark brown, terete, slender, glabrous; bud-scales glabrous, ovate, the margins sparsely ciliate or eciliate; leaves oblong to oblong-lanceolate, 3.5–6.5 cm. long, 1.5–2.5 cm. wide, rarely up to 3 cm. wide, acute or acuminate, broadly cuneate or subrotund at base, coriaceous, glabrous on both surfaces, chestnut-brown to olivaceous on the upper surface and usually strongly shining, pale olivaceous-green beneath, the margins cartilaginous, eciliate, narrowly revolute when dry; nerves 4 or 5 pairs, usually curved-ascending, arcuate-anastomosing, mostly strongly elevated beneath, the veinlets loosely reticulate on both surfaces, more obscure above; petioles 1 cm. long, glabrous; inflorescences cymose or subumbellate, axillary, solitary, about 2.5 cm. long, glabrous, 3–10-flowered; peduncles slender, 1–1.5 cm. long; pedicels subfiliform, 0.3–0.5 mm. long; bracteoles glabrous, linear, 1 mm. long; flowers apparently greenish, 4–6 mm. in diameter; calyx equally 5-lobed, glabrous, the lobes broadly ovate, 1 mm. long, shortly acute or obtuse, the margins minutely ciliate; petals 5, equal, fairly thin, oblong-ovate or ovate-lanceolate, 2–3 mm. long, 1–1.5 mm. wide, 5-nerved

(nerves prominent), shortly acute or obtuse, inflexed, the margins eciliate; stamens 5, unequal; filaments complanate, 1–1.5 mm. long, glabrous; anthers minute, ovoid or oblong, 0.5 mm. long, introrse; disc somewhat cup-shaped, irregularly shallowly lobed, the lobes 5, each obscurely tipped by a very minute indurated disciform gland; ovary ovoid, glabrous; styles 0.5 mm. long, glabrous; stigmas minute, rounded; carpidia suborbicular-obovate, when nearly mature about 5 mm. in diameter, glabrous, obscurely scrobiculate, when fresh red or reddish purple, without persistent petals at the base.

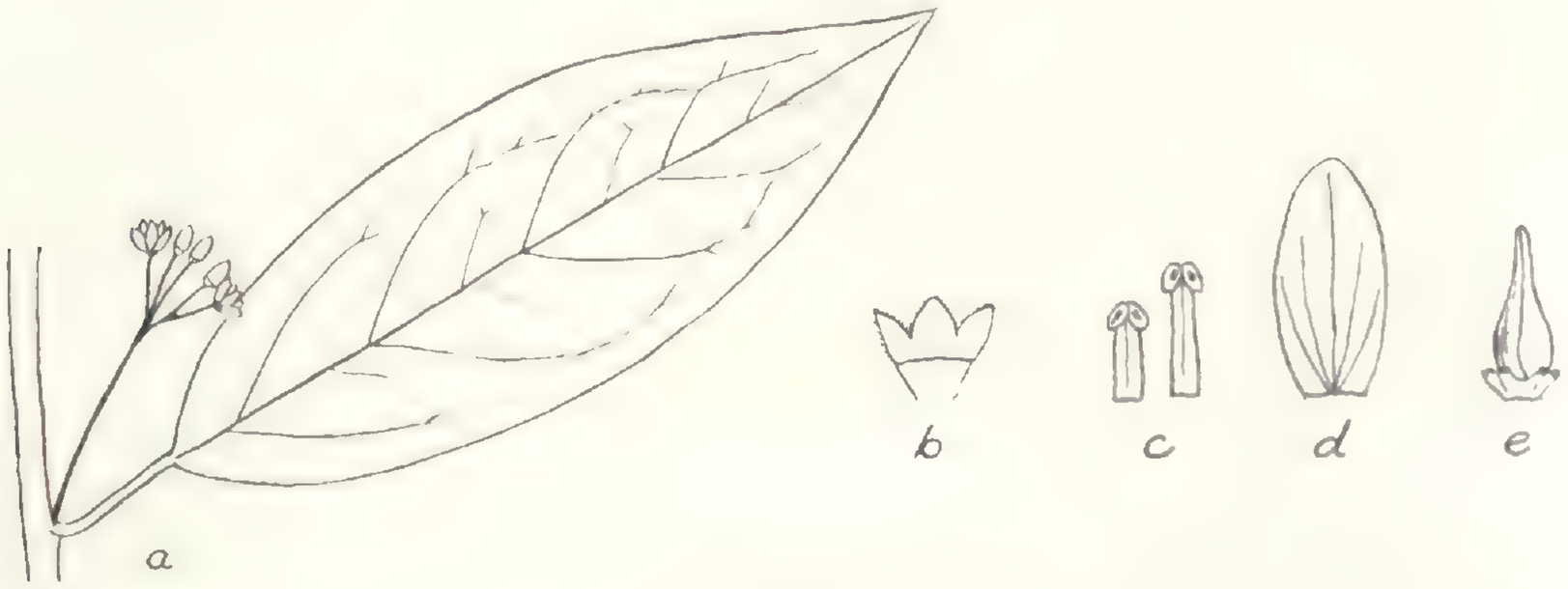

Fig. 5. *Sabia coriacea* Rehd. & Wils.; *a*, a branch with leaf and inflorescence, × 1; *b*, calyx, *c*, stamens, *d*, petal, *e*, ovary, style and disc, all × 5.

CHINA: Fukien, Liu Kai Kan, *Dunn, Herb. Hongk. 2534*, TYPE (A, photo. N), April–July, 1905, alt. 300 m.; Gang Keu, *J. L. Gressitt 1718* (A), July 25, 1936, alt. 635 m.; Kwangtung, Yam Na Shan, *W. T. Tsang 21362* (A, B, N, P), Aug. 4–31, 1932, fruit reddish purple; Lin Fa Shan, *W. T. Tsang 25510* (A), Aug. 11–31, 1935, fruit red; Fan Shui Shan, *S. K. Lau 2718* (A), Nov. 1–12, 1933, fruit pink, scandent, to 2–4.5 m., in thickets and in ravines.

DISTRIBUTION: China (Fukien, Kwangtung).

This species is characterized by its often shining, coriaceous, glabrous, loosely reticulate leaves and its cup-shaped, irregularly and shallowly lobed disc, each disc-lobe obscurely tipped by a very minute indurated disciform gland.

34. **Sabia purpurea** Hook. f. & Th. Fl. Ind. **1**: 209. 1855; Walp. Ann. Bot. Syst. **4**: 138. 1857; Hook. f. Fl. Brit. Ind. **2**: 2. 1879; Osmaston, For. Fl. Kumaon 132. 1927; Kanj. Kanj. Das & Purk. Fl. Assam **1**: 324. 1937.

Sabia parviflora Wall. List 1001. 1829, *nomen nudum* (pro parte).

A deciduous scandent shrub, the branches and branchlets pale brownish green to subolivaceous, terete, striate, glabrous; bud-scales glabrous, broadly ovate, the margins eciliate; leaves oblong to broadly oblong-lanceolate, 5–8 cm. long, 2–2.5 cm. wide, long-acuminate, broadly acute to rounded at base, firmly chartaceous, membranaceous when young, glabrous on both surfaces, olivaceous above, paler beneath, the margins narrowly cartilagineous; nerves 3 or 4 pairs, slender, curved, arched-anastomosing, not prominent above, elevated beneath, the reticulations rather prominent on the lower surface, somewhat obscure above; petioles 3–10 mm. long, slender; inflorescences shortly cymose, glabrous, about 1.5–2 cm. long, 3–5-flowered; peduncles 5 mm. long; pedicels 5–10 mm. long, slightly thickened upwards; bracteoles glabrous, linear, 1 mm. long; flowers 6–7 mm. in diameter, purplish or claret-colored; calyx equally 5-lobed, glabrous and with a few minute obscure reddish glandular dots, the lobes ovate, 0.5 mm. long, subacute, the margins subciliate; petals 5, equal, thin, ovate or triangular-ovate, narrowed upward from the very broad base, 3–3.5 mm. long, 1.5–2 mm. wide, acute or subobtuse, 5-nerved, the nerves nearly parallel, the margin eciliate; stamens 5, equal; filaments rather broad, linear, 1 mm. long, glabrous; anthers

oblong, 0.5 mm. long, extrorse; disc cup-shaped, irregularly deeply lobed, the lobes 5, somewhat fleshy, obtuse, without indurated glands; ovary ovoid, glabrous; styles 0.5 mm. long, glabrous; stigmas minute, rounded; carpidia suborbicular to obovate, 3–5 mm. in diameter, glabrous, distinctly scrobiculate, without persistent petals at the base.

INDIA: Assam, "Khasia," *Hooker f. & Thomson s.n.*, ISOTYPE (G), alt. 1200–1800 m.; Khasi and Jaintia Hills, Shillong, *L. F. Ruse 5* (A), flowers claret-colored, March 3, 1923, alt. 1500 m.; Nepal, *Wall. List no. 1001 in part* (N).

DISTRIBUTION: India.[1]

35. **Sabia falcata** sp. nov.

Frutex sempervirens, scandens, 3 m. altus, ramis ramulisque pallide olivaceo-viridibus, vel ramulis pallide brunneis, teretibus, striatis, glabris; perulis glabris, ovatis, breviter acuminatis, margine sparse ciliatis; foliis oblongo-lanceolatis vel anguste oblongo-ovatis, 7–12 cm. longis, 2–4 cm. latis, longe subcaudato-acuminatis (acuminibus plus minusve falcatis, apiculatis), basi late acutis vel obtusis, membranaceis, utrinque glabris, supra olivaceo-viridibus, subtus pallidioribus, margine angustissime subscarioso-cartilagineis, leviter undulatis, eciliatis, nervis 4 vel 5 utrinque, gracilibus, curvatis, arcuato-anastomosantibus, subtus elevatis, distinctis, venulis laxe reticulatis, supra obscuris, subtus manifestis; petiolo 7–8 mm. longo, glabro; inflorescentiis cymosis, circiter 2 cm. longis, glabris, 2–4-floris; pedunculis circiter 1 cm. longis, gracilibus; pedicellis 5 mm. longis; bracteolis glabris, linearibus, circiter 1 mm. longis, margine eciliatis; floribus 8 mm. diametro; calycibus glabris, lobis 5, aequalibus, ovatis, 1 mm. longis, breviter acutis vel obtusis, margine eciliatis; petalis 5, aequalibus, submembranaceis, oblongo-lanceolatis, 3.5–4 mm. longis, 1–3 mm. latis, circiter 5-nerviis, breviter acutis, margine eciliatis; staminibus 5, subaequalibus; filamentis complanatis, 0.5–0.8 mm. longis, glabris; antheris oblongis, 0.5 mm. longis, introrsis; disco cyathiformi, ecostato, irregulariter lobato, lobis 5, obtusis, glandulis parvis induratis disciformibus terminantibus; ovario ovoideo, glabro; stylis circiter 0.8 mm. longis, glabris; stigmatibus minutis, rotundatis; carpidiis suborbicularibus vel subreniformibus, 4–5 mm. diametro, glabris, subdistincte scrobiculatis, petalis ad basim subpersistentibus.

BURMA: Haka, *F. G. Dickason 7480*, TYPE (A), April 18, 1938, alt. 2188 m., a scandent shrub about 3 m. high.

DISTRIBUTION: Burma.

This species is allied to *Sabia parvifolia* Chen, but, as noted under that species, it has very much larger leaves.

36. **Sabia malabarica** Bedd. Ic. Pl. Ind. Orient. 39. *t. 177.* 1874; Hook. f. Fl. Brit. Ind. **2**: 2. 1876; Gamble, Fl. Presid. Madras **1**: 254. 1918.

"A glabrous climber, leaves from oblong to lanceolate with a gradual acumination ending in a mucro-coriaceous with the margin thickened, 3–4½ inches long by 1–2 broad, primary veins looped well within the margin and the reticulated veinlets very prominent on the under side, petioles ½ to 1 inch long, racemes axillary few flowered, or in axillary leaf-bearing panicles, flowers very small hermathrodite pentamerous, calyx minutely hairy, styles 2, petals oval, stamens shorter than the petals, filaments flat, ovules superposed, drupes flat reniform scrobiculate.

Anamallay forests, 3000–4000 feet elevation." [ex Beddome].

[1] Diels, Bot. Jahrb. **29**: 451. 1901, and Léveillé, Fl. Kouy-Tchéou 375. 1915, credited this species to China, but I have seen no Chinese specimens that I can refer to it, and I suspect that both records were based on erroneous identifications. This species seems to be limited to Assam and Nepal.

"Leaves elliptic-oblong acuminate margins waved base rounded, cymes very short 2–6-flowered, petals elliptic obtuse, filaments subulate.

WESTERN PENINSULA; Anamallay hills, alt. 3–4000 ft., *Beddome*.

A climbing shrub, quite glabrous. *Leaves* 3–5 by 1–1¾ in., thinly coriaceous, pale, margin cartilaginous; nerves many, spreading, much reticulated beneath; petiole ½–1 in. *Peduncle* ¼–½ in. *Flowers* $\frac{1}{10}$ in. diam. *Sepals* small, ovate, acute, ciliate. *Petals* glabrous. *Stamens* shorter than the petals. *Filaments* slender. *Anthers* didymous, cells diverging. *Ovules* subcollateral. *Drupe* ½ in., reniform, reticulated." [ex Hooker f.]. Disc more or less cup-shaped, irregularly deeply lobed, the lobes ovate, acute, without indurated glands. The one petal I have seen is but 2 mm. long.

Southern INDIA: Madras, Anamallay Hills, *Beddome* (K), alt. 900–1200 m.
DISTRIBUTION: Southern India.

I have seen no specimens representing this species, and the quoted descriptions seem to be all that have so far been published regarding it. The species is known only from the type collection. The description of the disc and the note concerning the length of the petals was added from a single flower from the type collection, courteously sent by Dr. A. D. Cotton of the Royal Botanic Gardens, Kew.

37. **Sabia parvifolia** sp. nov.

Frutex sempervirens, scandens, ramis ramulisque plerumque pallide brunneis, teretibus, striatis, glabris; perulis glabris, ovatis, margine eciliatis; foliis oblongis vel ovato-lanceolatis, 3–5 cm. longis, 1–1.8 cm. latis, distincte caudato-acuminatis (acuminibus apiculatis), basi subrotundatis, chartaceis, utrinque glabris, supra viridibus vel olivaceis, subtus paullo pallidioribus, margine angustissime cartilagineis, eciliatis, obscure revolutis; nervis 3–5 utrinque, curvatis, arcuato-anastomosantibus, subtus leviter elevatis, conspicuis, venulis prominenter reticulatis, supra obscuris; petiolo 4–7 mm. longo, glabro, margine ciliato; inflorescentiis cymosis, circiter 2 cm. longis, glabris, 3–5-floris; pedunculis 5–12 mm. longis; pedicellis brevibus, gracilibus, circiter 5 mm. longis; bracteolis glabris, lanceolatis, margine sparse ciliatis; floribus 6 mm. diametro; calycibus glabris, lobis 5, aequalibus, ovatis vel triangularibus, circiter 1 mm. longis, acutis vel obtusis, margine ciliatis; petalis 5, aequalibus, membranaceis, obscure minutissime rubro-punctatis, oblongo-ovatis vel ovato-ellipticis, circiter 3 mm. longis et 1.5 mm. latis, 3–5-nerviis, obtusis vel rotundatis, margine eciliatis; staminibus 5, inaequalibus; filamentis complanatis, brevibus, 0.5–0.8 mm. longis, glabris; antheris ovoideis, circiter 0.5 mm. longis; disco cyathiformi, ecostato, lobato, lobis 5, obtusis, glandulis parvis induratis disciformibus terminantibus; ovario ovoideo, glabro; stylis brevibus, circiter 0.8 mm. longis, glabris; stigmatibus minutis, rotundatis; carpidiis suborbicularibus vel orbiculari-obovatis, circiter 4–5 mm. diametro, glabris, scrobiculatis, petalis ad basim persistentibus vel tarde deciduis.

CHINA: Yunnan, Chenkang Snow Range, Pangca, *T. T. Yü 17082*, TYPE (A), July 29, 1938, alt. 2300 m., a common shrub in thickets, the immature fruit green.
DISTRIBUTION: China (Yunnan).

This species somewhat resembles *Sabia falcata* Chen but has much smaller, more distinctly reticulate leaves and broader petals which are rounded at their apices rather than acute.

38. **Sabia acuminata** sp. nov.

Frutex sempervirens, scandens, ramis ramulisque pallide viridibus vel pallide brunneis, gracilibus, teretibus, leviter flexuosis, striatis, glabris; perulis glabris, ovatis, acuminatis, margine eciliatis; foliis ovato-lanceolatis vel late oblongo-

lanceolatis, 5–8 cm. longis, 1.5–3 cm. latis, longe acuminatis, apicibus plerumque apiculatis, basi subrotundatis vel obtusis, tenuiter chartaceis vel submembranaceis, utrinque glabris, supra olivaceo-viridibus, opacis, subtus pallidioribus, nitidis, margine anguste cartilagineis, eciliatis, nervis 4 vel 5 utrinque, gracilibus, curvatis, arcuato-anastomosantibus, utrinque leviter elevatis et venulis graciliter reticulatis; petiolo 4–6 mm. longo, gracili, glabro; inflorescentiis paucis, axillaribus, solitariis, cymosis, 1–2 cm. longis, glabris, 2–4-floris; pedunculis 1–1.5 cm. longis, gracilibus; pedicellis 3–4 mm. longis, gracilibus; bracteolis glabris, anguste lanceolatis, 1 mm. longis, margine ciliatis; floribus ignotis; calycibus glabris, lobis 5, aequalibus, ovatis, breviter acutis vel late obtusis, margine eciliatis; disco cyathiformi, ecostato, irregulariter lobulato, lobis 5, obtusis, glandulis parvis induratis disciformibus terminantibus; ovario subconico vel ovoideo, glabro; stylis 0.5 mm. longis, glabris; stigmatibus minutis, rotundatis; carpidiis obovatis immaturis in sicco pallidis, 4 mm. longis, 3 mm. latis, glabris, levibus vel obscurissime scrobiculatis, petalis ad basim haud persistentibus.

China: Yunnan, Shunning, Huilungsu, *T. T. Yü 16171*, type (A), June 7, 1938, alt. 2050 m., a climbing shrub in thickets.

Distribution: China (Yunnan).

A species in the general alliance with *Sabia falcata* Chen of Burma and *S. parvifolia* Chen of Yunnan, but the carpels are non-scrobiculate or at most only very obscurely so.

39. **Sabia brevipetiolata** sp. nov.

Frutex suberectus, 2 m. altus, glaber, ramis purpureo-brunneis vel brunneis, teretibus, striatis, ramulis gracilibus, pallide viridibus vel subbrunneis; perulis glabris, late ovatis, obtusis, margine eciliatis; foliis junioribus membranaceis, elliptico-ovatis, maturis subchartaceis, ovato-lanceolatis vel oblongo-ovatis, 2.5–6.5 cm. longis, 1–2.5 cm. latis, acute acuminatis, basi rotundatis vel obtusis, utrinque glabris, supra olivaceis, subtus paullo pallidioribus, margine anguste scarioso-cartilagineis, eciliatis, leviter revolutis, nervis 3–5 utrinque, gracilibus curvatis, arcuato-anastomosantibus, subtus elevatis, venulis laxe reticulatis, supra obscuris; petiolo plerumque 2–3 mm. (rariter 4–5 mm.) longo, glabro; inflorescentiis cymosis, axillaribus, solitariis, 1–1.8 cm. longis, glabris, 2–4-floris; pedunculis 5–10 mm. longis, gracilibus; pedicellis brevibus, 3–4 mm. longis, gracilibus; bracteolis glabris, linearibus, circiter 1 mm. longis; floribus parvis, viridibus, circiter 5 mm. diametro; calycibus aequaliter 5-lobatis, glabris, lobis ovatis, 0.5 mm. longis, obtusis, margine eciliatis; petalis 5, aequalibus, oblongo-ellipticis, 2.5 mm. longis, 1.2 mm. latis, obtusis, 5-nerviis, margine eciliatis; staminibus 5, aequalibus; filamentis complanatis, 1 mm. longis, glabris; antheris ovoideis, 0.2 mm. longis, extrorsis; disco cyathiformi, ecostulato, margine lobulato, lobis ovatis, acutis vel obtusis, glandulis induratis nullis; ovario ovoideo, glabro; stylis 1.2 mm. longis, glabris; stigmatibus minutis, rotundatis; carpidiis viridibus, suborbicularibus, 4–5 mm. longis, 6 mm. latis, glabris, distincte scrobiculatis, petalis ad basim haud persistentibus.

China: Kwangsi, Loh Hoh Tsuen, Lin Yuin Hsien, *A. N. Steward & H. C. Cheo 171*, type (A, B, N), April 12, 1933, alt. 1150 m., shrub along roads, flowers green; same locality, *A. N. Steward & H. C. Cheo 712* (A), July 10, 1933, alt. 1150 m., fruit green; Kweichow, Chengfeng, *Y. Tsiang 4630* (A, N, U), Oct. 17, 1930, a shrub in dense woods, fruits blue.

Distribution: China (Kwangsi, Kweichow).

This is allied to *Sabia Wangii* Chen, but it can be distinguished from that species by its shorter petioles, peduncles, and pedicels, and by its persistent bracteoles, which are glabrous, linear, and about 1 mm. long. It also resembles *Sabia olacifolia* Stapf, but it has much smaller leaves and usually much shorter petioles than does Stapf's species, while its pedicels are very much shorter.

40. **Sabia Wangii** sp. nov.

Frutex sempervirens, glaber, scandens, ramis ramulisque pallide viridibus, teretibus, striatis, gracilibus, glabris; perulis glabris, ovatis, acutis, margine minutissime ciliatis; foliis submembranaceis, ovato-lanceolatis vel oblongo-ovatis, 4–7 cm. longis, 1.5–2.8 cm. latis, graciliter et acute acuminatis, acuminibus interdum leviter falcatis, basi late rotundatis vel truncato-rotundatis vel fere subcordatis, utrinque glabris, supra olivaceis, subtus paullo pallidioribus, margine anguste cartilagineis, eciliatis; nervis 4 vel 5 utrinque, gracilibus, curvatis, arcuato-anastomosantibus, subtus elevatis, venulis laxe reticulatis, supra obscuris; petiolo 3–4 mm. (rariter 5 mm.) longo, glabro; floribus (haud visis) cymosis, cymis axillaribus, solitariis, circiter 3 cm. longis, glabris, 2- vel 3-floris, pedunculis sub fructu 1.5–2 cm. longis, gracilibus; pedicellis circiter 1–1.5 cm. longis, gracilibus; bracteolis caducis; sepalis glabris, aequalibus, ovatis, 0.5 mm. longis, obtusis vel rotundatis, margine eciliatis; disco cyathiformi, ecostulato, margine lobulato, lobis 5, ovatis, acutis vel obtusis, eglandulosis; ovario ovoideo, glabro; stylis 1 mm. longis, glabris; stigmatibus minutis, rotundatis; carpidiis viridibus, suborbicularibus, vel inaequilateraliter subreniformibus, circiter 5 mm. diametro, glabris, scrobiculatis, petalis ad basim haud persistentibus.

China: Kwangsi, Nam Tayuen, *C. Wang 40857,* type (A), June 22, 1937, alt. 750 m., a scandent shrub near streams, flowers white, fruit green.

Distribution: China (Kwangsi).

This somewhat resembles *Sabia olacifolia* Stapf, but it may be distinguished by its smaller leaves, which are broadly truncate-rounded at their bases, as well as by its elongated slender pedicels. There are no petals on the material available, most of the flowers being just past anthesis.

41. **Sabia Dielsii** H. Lév. Rep. Sp. Nov. **9:** 456. 1911, Fl. Kouy-Tchéou 379. 1915; Rehder, Jour. Arnold Arb. **15:** 9. 1934.

An evergreen scandent shrub, the branches and branchlets dark brown, shiny, terete, flexuous, glabrous; bud-scales glabrous, ovate or broadly ovate, the margins eciliate; leaves lanceolate, 6–12 cm. long, 2–3 cm. wide, gradually tapering upward to the long acuminate apex, broadly acute or rounded at base, chartaceous, glabrous on both surfaces, olivaceous and usually shining on the upper surface, pale green beneath, the margins very narrowly cartilagineous, slightly undulate, eciliate, slightly revolute; nerves 4 or 5 pairs, slender, ascending, arcuato-anastomosing, not conspicuous on the upper surface, prominently elevated beneath, the veinlets loosely reticulate on the lower surface, obscure above; petioles 4–7 mm. long, glabrous; inflorescences cymose, 2.5 cm. long, glabrous, 2–4-flowered; peduncles slender, 2 cm. long; pedicels slender, slightly thickened upwards, 8 mm. long; bracteoles caducous; flowers 5-merous, greenish yellow (ex Léveillé); calyx equally 5-lobed, glabrous; petals ovate, obtuse; stamens 5, short; disc cup-shaped, shallowly 5-lobed, the lobes without indurated glands; ovary ovoid or conical, glabrous; styles short, about 1 mm. long, glabrous; stigmas minute, somewhat rounded; carpidia subreniform or suborbicular, 6 mm. long, 7–8 mm. wide, glabrous, distinctly scrobiculate and with scattered but distinct slightly raised brown spots, without persistent petals at the base.

China: Kweichow, Pin-fa, *J. Cavalerie 1008* (fragment of mero-syntype and photo. of syntype A), May 14, 1903, and without locality, *J. Esquirol 474* (fragment of mero-syntype and photo. of syntype A, photo. N); Yunnan, Ping-pien Hsien, *H. T. Tsai 62774* (A), alt. 1500 m., July 18, 1934.

Distribution: China (Kweichow, Yunnan).

The Yunnan collection, *Tsai 62774,* closely matches our fragments of the Cavalerie and Esquirol collections from Kweichow. The species is characterized

by its mature carpidia being provided with scattered slightly raised almost pustular brown spots. The description of the disc has been added from *Tsai 62774*. I have seen no flowers, such data as are above included in the description being taken from Léveillé's original, very inadequate description. Rehder, Jour. Arn. Arb. **15**: 9. 1934, reduced *Sabia puberula* Rehd. & Wils. to Léveillé's species, but I consider the two to be distinct.

42. **Sabia olacifolia** Stapf, in herb. sp. nov.

Sabia olacifolia Stapf (err. "Dunn") ex Anon. Acta Phytotax. Geobot. **5**: 78. 1936, in clavis Japonice, *nomen nudum*.

Frutex sempervirens, scandens, glaber, ramis ramulisque plerumque stramineis vel pallide flavido-viridibus, teretibus, striatis, gracilibus; perulis glabris, lanceolatis, margine eciliatis; foliis elliptico-ovatis vel ovato-lanceolatis, 6–14 cm. longis, 2.5–6 cm. latis, distincte acuminatis, basi late acutis vel rotundatis, interdum leviter decurrentibus, chartaceis vel submembranaceo-chartaceis, supra olivaceis, subtus paullo pallidioribus, margine anguste cartilagineis, leviter undulatis, eciliatis, revolutis; nervis 4–6 utrinque, curvatis, arcuato-anastomosantibus, subtus elevatis, distinctis, venulis laxe reticulatis, supra obscuris; petiolo 6–15 mm. longo, glabro; inflorescentiis cymosis, axillaribus, solitariis, 2.5–6 cm. longis, 2–6-floris; pedunculis gracilibus, 2.5–4 cm. longis; pedicellis gracilibus, 5–10 mm. longis; bracteolis linearibus, 2 mm. longis, glabris; floribus viridibus, circiter 5 mm. diametro; calycibus glabris, lobis 5, aequalibus, ovatis, circiter 1 mm. longis, acutis vel obtusis, margine eciliatis; petalis 5, aequalibus, membranaceis, obovatis vel ovato-ellipticis, 2–2.5 mm. longis, 1.5–2 mm. latis, rotundatis, 5-nerviis, margine eciliatis; staminibus 5, aequalibus; filamentis crassis, circiter 0.8 mm. longis, glabris; antheris ovoideis, circiter 0.5 mm. longis, extrorsis; disco cyathiformi, regulariter lobulato, lobis 5, obtusis, glandulis induratis nullis; ovario ovoideo, glabro; stylis circiter 1 mm. longis, glabris; stigmatibus minutis, rotundatis; carpidiis subreniformibus vel suborbicularibus, circiter 8 mm. diametro, glabris, perspicue scrobiculatis, primo albo-rubris, maturis atris (fide Henry), petalis ad basim haud persistentibus.

China: Yunnan, Shunning, *T. T. Yü 16821* (A), July 18, 1938, alt. 1680 m.; Kien-Shuei Hsien, *H. T. Tsai 53116* (A), Apr. 11, 1933, alt. 1900 m.; Ping-pien, *H. T. Tsai 60912, 60982, 61010* (A), July 15–19, 1934, alt. 1400–1500 m.; Mengtze, *A. Henry 10250,* type (A, N, photo. N), Nov. 22, alt. 1500 m.; without locality, *H. T. Tsai 62823* (A). Indo-China: Tonkin, Chapa, *A. Pételot 1774, 3069* (A, C), *2182, 2183, 3793* (A), along roads in forests, alt. 1500–1600 m., April, July, and August, 1925, 1927, 1930, and 1936.

Distribution: China (Yunnan), Indo-China (Tonkin).

This species is characterized by being entirely glabrous, and by its long-peduncled, simple or subsimple, few-flowered cymes, its elliptic-ovate to ovate-lanceolate acuminate leaves, the shallowly lobed disc being without indurated glands. The basis of the name is a single sheet, *Henry 10250,* in the Kew Herbarium, the pencilled name *Sabia olacifolia* is in what may be Stapf's handwriting. There is a photograph of this sheet in the Britton Herbarium, New York Botanical Garden.

43. **Sabia tomentosa** Hook. f. Fl. Brit. Ind. **2**: 3. 1879.

"Branches and nerves of leaves beneath tomentose, leaves elliptic or elliptic-lanceolate acute, petiole very short, panicles branched many-flowered and glabrous, petals linear-oblong, stamens included.

Upper Assam? alt. 3500 ft., *Griffith*.

Branches slender, the younger clothed with soft spreading hairs, as are the petioles. *Leaves* $2\frac{1}{2}$ by 1 in., rather coriaceous, bullate between the spreading nerves, which are very prominent and hairy beneath; petiole $\frac{1}{10}$ in. *Panicle*

much branched, many-flowered, peduncle puberulous; branches and pedicels slender, glabrous. *Flowers* $\frac{1}{12}$ in. diam. *Filaments* ligulate, shorter than the petals. *Fruit* didymous, of two obovoid diverging rugose subcompressed carpels, each nearly $\frac{1}{3}$ in. long.—The only specimen I have seen has but two leaves, and is remarkable for its very short petioles and tomentum. There is no habitat on the ticket, which resembles those of Griffith's journey from Upper Assam to Birma. It contains the following inscriptions:—'Sabia sp., fructibus subrotundis. 15. Alt. 3500.'" [ex Hooker f.] Disc cup-shaped, regularly shallowly lobed, the lobes small, each prominently tipped by a small indurated disciform gland. Petals not seen, but if Hooker's measurement of the flower diameter is correct (one-twelfth inch) they should be less than 2 mm. in length.

DISTRIBUTION: Upper Assam or Burma, alt. about 1000 m.

I have seen no specimens representing this species. The disc characters have been added to Hooker's quoted description from a flower of the Griffith collection on which Hooker's description was based, kindly sent by Dr. A. D. Cotton of the Royal Botanic Gardens, Kew, who also courteously provided a photograph of the type sheet in the Kew Herbarium.

44. **Sabia Wardii** W. W. Smith, Notes Bot. Gard. Edinb. **10:** 64. 1917.

"Species affinis *S. tomentosae,* Hook. f. a qua petiolis longioribus, pedicellis pilosulis, sepalis sparsim pilosulis divergit.

Frutex vix 2 m. altus; ramuli pilis patentibus fulvidis dense tomentosi. Folia petiolo 6–7 mm. longo fulvido-tomentoso suffulta; lamina vulgo 6–12 cm. longa, 3–5 cm. lata, elliptico-lanceolata vel elliptica, apice acutissima vel breviter acuminata, basi rotundata, subcoriacea, supra atroviridis glabra nisi ad costam impressam pilosulam, infra subcuprea glabra costa nervisque sparsim pilosis exceptis; nervi 4–5 paria fere recto angulo abeuntes longe intra marginem arcuatim confluentes. Flores flavido-virides in paniculas ramosas dispositi; pedunculi 2.5–5 cm. longi dense fulvido-pilosi; ramuli pedicellique graciles dense pilosi. Sepala 1.5–2 cm. [mm.] longa, ovato-lanceolata, acuta, extus sparsim pilosula. Petala circ. 3 mm. longa, fere 2 mm. lata, plus minusve elliptica, obtusa. Stamina circ. 2 mm. longa filamentis complanatis. Discus glaber. Ovarium glabrum vix 1 mm. diametro; stylus 1 mm. paulo superans stigmate minuto. Fructus deest.

'Northern Burma:—On granite conglomerate of Putao ridge, in thickets, partly shaded; 1200 ft. Lax shrub of about 5 ft. Flowers pale greenish-yellow. Nov. 1914.' F. K. Ward. No. 1955.

This species must be closely akin to the little known *S. tomentosa,* Hook. f. which is described as having shorter petioles, the pedicels and branchlets of inflorescence glabrous, and much smaller flowers." (TYPE E, frustulum A).

I have seen but a single leaf and inflorescence representing this species, this material from the type collection at the Royal Botanic Garden, Edinburgh, having been courteously supplied by Sir W. W. Smith. The following additional descriptive data are supplied: sepals, petals, stamens, and ovary minutely reddish-glandular. The sepals are 1.5–2 mm. long (not cm. as inadvertently stated in the original description). The filaments are subequal and much widened below. The disc is cup-shaped, regularly and deeply lobed, the lobes ovate, acute or subacute, and without indurated glands.

45. **Sabia lanceolata** Colebrooke, Trans. Linn. Soc. **12:** 355. *t. 14.* 1819; Wall. in Roxb. Fl. Ind. **2:** 309. 1824; Spreng. Syst. Veg. **1:** 779. 1825; Dietr. Synop. Pl. **1:** 804. 1839; Blume, Mus. Bot. Lugd.-Bat. **1:** 368. 1851; Hook. f. & Th. Fl. Ind. **1:** 210. 1855; Walp. Ann. Bot. Syst. **4:** 138. 1857; Hook. f. Fl. Brit. Ind. **2:** 2. 1876; Warb. in Engl. & Prantl, Nat. Pflanzenfam. **3**(5): 370. *f. 184, A–H,* 1895; Gammie, Records

Bot. Surv. Ind. **1**: 79. 1895; Collett, Fl. Simlensis 101. 1921; Kanj. Kanj. Das & Purk. Fl. Assam **1**: 325. 1937.

An evergreen climbing shrub, the branches and branchlets slender, flexuous, mostly pale brownish; bud-scales glabrous, lanceolate, eciliate, pubescent, soon becoming glabrous or nearly so; leaves lanceolate or oblong-lanceolate, 7–16 cm. long, 2.5–5 cm. wide, acute or acuminate, acute to rounded at base, chartaceous to firmly chartaceous, pale green to olivaceous-green, glabrous except the midrib which bears a few hairs on the upper surface, glabrous and paler beneath, the margins cartilagineous, eciliate, narrowly revolute; nerves 8–12 pairs, spreading, somewhat curved, prominently arcuate-anastomosing, not very distinct above, strongly elevated beneath, the primary reticulations lax, distinct; petioles 0.5–1.5 cm. long, stout, somewhat wrinkled, slightly pubescent or glabrous; inflorescences axillary and terminal, corymbose, 4–5 cm. long, 10–20-flowered, sparsely pubescent or glabrous; peduncles 2.5–3.5 cm. long; pedicels 3–6 mm. long; bracteoles caducous; flowers greenish or greenish white, 5–7 mm. in diameter; calyx equally 5-lobed, glabrous, minutely and obscurely reddish-glandular, the lobes ovate, acute, 1 mm. long, the margins eciliate; petals 5, equal, oblong-ovate to broadly ovate-lanceolate, 3.5–5 mm. long, 1.5–2 mm. wide, 3–5-nerved, acute or obtuse, minutely reddish-glandular, the margins eciliate; stamens 5, subequal; filaments subulate, 1.5–2 mm. long, glabrous, minutely reddish-glandular; anthers ovoid, 0.2 mm. long, extrorse; disc cup-shaped, irregularly lobed, the lobes distinct, each tipped by a small indurated disciform gland; ovary subglobose or ovoid, glabrous, minutely reddish-glandular; styles slender, 0.5–0.8 mm. long, glabrous, minutely reddish-glandular; stigmas minute, rounded; carpidia blue when mature, pyriform, rounded, narrowed and often inequilateral below, 12 mm. long, 6–8 mm. wide, glabrous, only slightly compressed, the scrobiculations very obscure, the exocarp often nearly smooth, with or without persistent petals at the base.

INDIA: Eastern Bengal, *Herb. Griffith 111* (G); Assam, "Khasia Hills," *J. D. Hooker & T. Thomson s.n.* (G); *Native Collectors* (*Herb. Calcutta*) *s.n.* (A, B, G); *Herb. Sulp. Kurz s.n.* (B, U); *G. Mann s.n.* (U); Nya Bungalow, *C. B. Clarke 37314* (U), Feb. 22, 1885, alt. 600 m.; near Mairong, *Herb. Schlagintweit 472* (G, U), Oct., 1855, alt. 850–1350 m.; Julu Bosty, *Prain's Collector 346* (A), Oct., 1898, *Simons s.n.* (B), *Col. Jenkins s.n.* (B), without collector and number (G); Manipur, *A. Meebold 6119* (P); "Khasya," *Griffiths 331* (N); Without locality, collector, or number, from *Herb. Royal Gardens, Kew* (N).

DISTRIBUTION: Known only from India.

This species is characterized by its relatively large, smooth, glabrous, and irregularly subpyriform carpidia.

46. **Sabia paniculata** Edgew. in Hook. f. & Th. Fl. Ind. 1: 211. 1855; Walp. Ann. Bot. Syst. **4**: 139. 1857; Brandis, For. Fl. N.-W. Centr. Ind. 117. 1874; Hook. f. Fl. Brit. Ind. **2**: 3. 1879; Kanj. For. Fl. School Circ. N.-W. Prov. 94. 1901; For. Fl. Siwalik Jaunsar, United Prov. 122. 1911; Duthie, Fl. Upper Gangetic Plain **1**: 183. 1903; Gamble, Manual Ind. Timb. ed. 2. 204. 1902, Reprint 204. 1911; Burkill, Records Bot. Surv. Ind. **4**: 103. 1910; Haines, Bot. Bihar Orissa **2**: 218. 1921; Osmaston, For. Fl. Kumaon 132. 1927; Kanj. Kanj. Das & Purk. Fl. Assam **1**: 326. 1937. **Fig. 6.**

A large evergreen climber, the branches terete, striate, with a few hairs, then becoming glabrous with age; branchlets terete, striate, slender, pubescent; leaves elliptic, oblong-elliptic, broadly lanceolate, or oblong-lanceolate, 12–20 cm. long, 5–9 cm. wide, shortly acuminate or acute, broadly acute or rounded at base, coriaceous, glabrous on both surfaces, dark green on the upper surface, pale and sparsely pubescent on the midrib beneath when young, the margins cartilaginous, eciliate; nerves 3–5 pairs, curved-ascending, arched and joined by means of the secondary veins near the margin, strongly elevated beneath and with the veinlets

and reticulations prominent on both surfaces; petioles 1.5–2.5 cm. long, stout, somewhat wrinkled, pubescent or sparsely pubescent; inflorescences axillary, paniculate, usually longer than the leaves, 20–25 cm. long, pilose, sometimes bearing a few juvenile leaves, with numerous, alternate, racemosely arranged, lateral, compound cymes, the ultimate cymules 3–6-flowered, the lateral branches

Fig. 6. *Sabia paniculata* Edgew.; *a*, a branch with leaf and inflorescence, × 1; *b*, calyx, *c*, petal, *d*, stamens, *e*, ovary, style and disc, all × 5.

2–3 cm. long; pedicels 5–8 mm. long; bracteoles pilose, linear, 1 mm. long; flowers very numerous, small, yellowish, 4–5 mm. in diameter; calyx equally 5-lobed, rather prominently pubescent and with numerous, obscure, minute, reddish-glandular dots, the lobes ovate or oblong, acute or subacute, 1 mm. long, the margins ciliate; petals 5, equal, fairly thick, oblong, 2.5–3 mm. long, up to 1 mm. wide, prominently 5-nerved, acute or obtuse, the margins eciliate; stamens

5, equal; filaments 1 mm. long, glabrous; anthers oblong, 0.5 mm. long, introrse; disc cup-shaped, slightly ribbed or folded outward, the margin shallowly 5-lobed, the lobes minute, each tipped by a small disciform indurated gland; ovary conical or ovoid, glabrous; styles 0.8 mm. long, glabrous; stigmas minute, rounded; carpidia suborbicular, inequilaterally obovate or subreniform, 7–8 mm. long, 8–9 mm. wide, glabrous, prominently scrobiculate, without persistent petals at the base.

INDIA: United Provinces, Kumaon, *R. Strachey & J. E. Winterbottom 2* (G), alt. 600 m.; Jeolekote, *N. Gill 414* (B), Jan. 17, 1910, alt. 1400 m.; Dehra Dun, *U. Singh 172* (A, B, C, N, P), Feb. 21, 1928, flowers yellowish; *J. S. Gamble 24549* (U), Jan., 1894; Siwalik & Jaunsar Divisions, *C. S. Rawat 34* (A), in flower March 28, in fruit July 15, 1921, *A. D. Ahmad 35* (N), in 1923, flowering in March, fruiting in July, *M. L. Punj 36* (N), a large climber, flowering in March, fruiting in July, *B. N. R. Choudhury 39* (U), *M. S. Hasoi 50* (U), Feb., 1920, *R. C. Singh 54* (C), in flower March 31, in fruit April 26, 1921; Western Nepal, Garba, Doti District, *Bis Ram 249* (A, N); Northern Bengal, without locality, *K. Biswas 1694* (A, N). UPPER BURMA: Kachin Hills, *Shaik Mokin 60* (B, U), May, 1898.

DISTRIBUTION: India (United Provinces, Western Nepal, Northern Bengal), Burma.

This species is well marked by its large leaves and its ample, many-flowered, axillary panicles, which equal or exceed the leaves in length, being made up of alternate, racemosely arranged compound cymes, the ultimate cymules 3–6-flowered.

47. **Sabia limoniacea** Wall. List no. 1000. 1829, *nomen nudum;* Hook. f. & Th. Fl. Ind. **1:** 210. 1855; Walp. Ann. Bot. Syst. **4:** 139. 1857; Kurz, For. Fl. Brit. Burma **1:** 300. 1877; Hook. f. Fl. Brit. Ind. **2:** 3. 1879; King, Jour. As. Soc. Bengal **65**(2): 454. 1896 (Mater. Fl. Malay. Penin. **2:** 740); Prain, Bengal Pl. 348. 1903; Ridley, Fl. Malay Penin. **1:** 513. 1922; Kanj. Kanj. Das & Purk. Fl. Assam **1:** 326. 1937.

Sabia celastrinea C. Muell. in Walp. Ann. Bot. Syst. **6:** 1269. 1861 (in indice) *nomen nudum*, based on *Celastrinea* Wall. List no. 9015. 1849. **Fig. 7.**

An evergreen climbing shrub, the branches and branchlets dark brown, terete, striate, glabrous; bud-scales glabrous, ovate, the margins eciliate; leaves lanceolate or oblong, 8–17.5 cm. long, 4.5–6.5 cm. wide, acute or shortly acuminate, sometimes obtuse or subobtuse, acute to subrounded at base, coriaceous, glabrous on both surfaces, olivaceous to grayish on the upper surface, pale greenish yellow to brownish yellow or brown beneath, the margins cartilagineous, eciliate, slightly revolute; nerves 6 or 7 pairs, slender, ascending, arched-anastomosing, distinct and elevated on the lower surface, much less distinct above, the veinlets finely reticulate on both surfaces; petioles 1.5–2.5 cm. long, stout, wrinkled, glabrous; inflorescences consisting of small cymes arranged in long, narrow, axillary, solitary, glabrous, many-flowered panicles 7–15 cm. long; lateral branches stout, 5–10 mm. long, often subtended by small leaves, but in most cases the inflorescences are leafless, the individual cymules mostly 2- or 3-flowered; pedicels slightly thickened upward, 3–4 mm. long; bracteoles sparsely pubescent, linear, 1 mm. long; flowers small, 3–4 mm. in diameter, greenish white to greenish yellow, occasionally slightly pinkish; calyx equally 5-lobed, glabrous, the lobes ovate or oblong-ovate, 0.5 mm. long, acute or obtuse, the margins ciliate to subciliate; petals 5, equal, fairly thick, obovate to elliptic-ovate, 1.5–2 mm. long, 1–1.6 mm. wide, rounded, obtuse, or broadly acute, 5-nerved, the nerves obscure, the margins subciliate; stamens 5, unequal; filaments fleshy, subcompressed, 1–1.5 mm. long, glabrous; anthers minute, ovoid, 0.2 mm. long, introrse; disc cup-shaped, smooth, the margin irregularly or regularly lobed, the lobes 5, obscurely terminated by very minute indurated glands; ovary ovoid or conical, glabrous; styles short, 0.5 mm. long, glabrous; stigmas minute, somewhat rounded; carpidia obliquely orbicular to subreniform, 10 mm. in diameter,

apparently blue when mature, glabrous, the scrobiculations obscure, without persistent petals at the base.

INDIA: Assam, "Khasia and Silhet," *J. D. Hooker & Thomson s.n.* (G, N), alt. up to 900 m.; Sylhet Station, *C. B. Clarke 18005* (P), Nov. 22, 1872; Jaboca, near Tengali Bam, and Naga Hills, *Prain's Collector 415, 626* (A), Nov., 1898 and Jan., 1899, *Col. Jenkins s.n.* (G, N). Lower SIAM: Khan Pok Hill, *Md. Haniff & Md. Nur 3843* (C), Dec. 2, 1918, alt. 450 m., flowers pinkish. SUMATRA: Gunong Merapi, *H. A. B. Bunnemeijer 4926* (B), Sept. 26, 1918, alt. 1150 m. CHINA: Yunnan, Jenn-yeh Hsien, *C. W. Wang 80118* (A), Oct., 1936, alt. 980 m.; Che-li Hsien, *C. W. Wang 79409, 79501, 81027* (A), June, Sept., Oct., 1936, alt. 800–1300 m.

Fig. 7. *Sabia limoniacea* Wall.; *a,* a branch with leaf and inflorescence, × 1; *b,* an inflorescence, × 1; *c,* calyx, *d,* stamens, *e,* petal, *f,* ovary, style and disc, all × 5.

DISTRIBUTION: Northern India, Burma (fide Hooker f. and Thomson), Siam, Malay Peninsula (fide King), Sumatra, China (Yunnan).

This rather widely distributed species has by no means always been correctly interpreted, and naturally it presents considerable variation. The axillary, solitary, elongated, narrow, normally rather many-flowered panicles are characteristic, the few-flowered cymules being racemosely arranged along the axis, the peduncles of the cymules often subtended by juvenile leaves. The Sumatra specimens from Gunong Merapi have smaller leaves than the specimens from India and elsewhere (7–11 × 2.5–4 cm.), and eventually, when better material

becomes available, may be otherwise disposed of, but in all characters that I consider to be essential, the collection seems to fall within the limits of Wallich's species. The specimens are incomplete in that there are no good flowers and the few small fruits appear to be abnormal.

Sabia limoniacea was a *nomen nudum* proposed by Wallich, List no. 1000. 1829, based on a specimen from Silhet; later Hooker f. and Thomson accepted the name and provided a technical description based on collections from Assam, Khasia, Silhet, and Chittagong, including Wallich's specimen. At the same time they reduced *Celastrinea* Wall. List no. 9015. 1849, based on a specimen collected by Gomez in Silhet, and to which C. Mueller, Walp. Ann. Bot. Syst. **4**: 139. 1857, assigned the binomial *Sabia celastrinea* C. Muell.

In working up the botany for the Voyage of the "Herald," Seemann, Bot. Voy. Herald 362. 1857, referred Champion's Hongkong specimen on which *Androglossum reticulatum* Champ. was based to the Indian *Sabia paniculata* Edgew. This is an error, for although *Androglossum reticulatum* Champ. is a *Sabia,* it is a species distinctly different from the one Edgeworth described. In 1861, Bentham, Fl. Hongk. 70. 1861, referred *Androglossum reticulatum* Champ. to the Indian *Sabia limoniacea* Wall., which is clearly closer to this Chinese form than is *Sabia paniculata* Edgew. I note certain differences, however, between authentic Indian specimens representing *Sabia limoniacea* Wall. and the form from southeastern China currently referred to that species, and I am of the opinion that this Kwangtung-Kwangsi-Hainan form is worthy of at least varietal rank. Dr. Merrill called my attention to the problem of the identity of *Myrsine ? ardisioides* Hook. & Arn. Bot. Beechey Voy. 197. 1836, the type of which was a fragmentary specimen from the general vicinity of Macao. A search for the type at Kew, Cambridge University, and Glasgow failed, and Dr. Merrill concluded that the type is probably no longer extant. In his treatment of the Myrsinaceae, Pflanzenr. **9** (IV. 236): 397. 1902, Mez correctly excluded the species from the Myrsinaceae, referring it with doubt to *Sabia,* and Walker, Philip. Jour. Sci. **73**: 193. 1940, excluded it from *Myrsine,* listing it as *Sabia* sp. When I was studying *Sabia limoniacea* Wall. I was reminded of certain characters assigned to *Myrsine ? ardisioides* Hook. & Arn., and from a critical consideration of all factors I am convinced that the latter species, long of doubtful status even as to its family, is the same as the form that Champion characterized as *Androglossum reticulatum.* Hooker and Arnott, in describing this Chinese form state: "Indeed, it is probable not only that the plant does not belong in *Myrsine,* but not even to the same Natural Order." I therefore propose the following disposition of this southeastern China form long placed as a synonym of *Sabia limoniacea* Wall.:

47a. **Sabia limoniacea** Wall. var. **ardisioides** var. nov.

Myrsine ? ardisioides Hook. et Arn. Bot. Beech. Voy. 197. 1836, non H.B.K. (1818), syn. nov.

Androglossum reticulatum Champ. ex Benth. in Hook. Kew Jour. Bot. **4**: 42. 1852, syn. nov.

Sabia paniculata sensu Seem. Bot. Voy. Herald 362. 1857, non Edgew. (1855).

Sabia limoniacea sensu Benth. Fl. Hongk. 70. 1861; Forbes & Hemsl. Jour. Linn. Soc. Bot. **23**: 144. 1886; Merr. Lingnan Sci. Jour. **5**: 119. 1928, vix Wall.

A typo differt inflorescentiis calycibusque plus minusve pubescentibus ceteroquin ut in *Sabia limoniacea* Wall.

China: Fukien, Yuen Fu Valley, *Dunn, Hongkong Herb. 2538* (A), April–June, 1905; Hongkong, *Herb. Hance 5230* (G), Oct., 1859; Kwangtung, Lofoushan, *Y.*

Tsiang 1681 (A, C, N), Dec. 21, 1928, altitude 230 m., *S. P. Ko 50106* (N), Feb. 26, 1930; Wan Tong Shan, *T. M. Tsui 402* (A, N), June, 1932, *W. T. Tsang & K. C. Wong, CCC 14575* (A, C), Oct. 17, 1926; Fan Shiu Shan, *S. K. Lau 2526* (A), Oct., 1933; Yung-Yun, *S. K. Lau 828* (A, N), Dec. 20, 1932; Wat Shui Shan, *H. D. Wong 7437* (P), Nov. 10, 1928, *Wang & Ling 7437* (C), Nov., 1928; Lokchong, *C. L. Tso 20689*[1] (B, N), May 20, 1929, *20387* (N), May 10, 1929; Ying Tak, *Y. K. Wong 527* (C), Jan. 15, 1929; Tsing Wen, *To Kang Peng CCC. 8759* (P), Jan. 20, 1922, *Y. F. Chun 30475* (N), March 23, 1930; Taai Leng Shan, *S. Y. Lau 20037* (N), March 12, 1932; Kwangsi, Bako Shan, West of Poseh, *R. C. Ching 7603* (L, N), Sept. 23, 1928, altitude 800 m.; Shap Man Taai Shan, southeast of Shang-sze, near the Kwangtung border, *W. T. Tsang 22201, 24041* (A), *24415*, TYPE (A, N), May, Aug. and Oct., 1933–1934; Tou Ngok Shan, *W. T. Tsang 23117* (A), Nov. 7, 1933; Hainan, Yaichow, Po-ting, Ng Chi Leng (Five Finger Mountains), Mo San Leng, and without locality, *N. K. Chun & C. L. Tso 44767* (A, N, U), Jan., 1933; altitude 350 m., *F. C. How 72090* (A, B), alt. 300 m., *F. A. McClure CCC 8704* (A, P), Dec. 20, 1921; *W. Y. Chun 6673* (C), *N. K. Chun and C. L. Tso 44390* (A, N), Nov., 1932, alt. 650 m., *C. Wang 35676, 35930* (A, N), Dec., 1933, *H. Y. Liang 64692, 64694* (N), Jan. 16, 1933.

DISTRIBUTION: China (Fukien, Hongkong, Kwangtung, Kwangsi, Hainan).

The varietal name *ardisioides* has been selected independently of Hooker & Arnott's use of it, but with the definite conviction that *Myrsine ? ardisioides* Hook. & Arn. represents the same entity as *Sabia limoniacea* Wall. var. *ardisioides* Chen.

This variety is apparently distinguishable from the species only by its more or less pubescent inflorescences. In leaf-size and shape, and in often having juvenile leaves on the panicle-rachis subtending the peduncles of the cymules, it parallels similar variants in the typical Indian form of the species. The flowers of this Chinese form are variously described as white, pale yellow, or yellowish white, and the young fruits as pink or red, becoming blue at maturity.

48. **Sabia javanica** (Blume) Backer in herb. comb. nov.

Meniscosta javanica Blume, Bijdr. 29. 1825.

Meniscosta scandens Blume ex Spreng. Syst. Veg. **4**(2): Cur. Post. 114. 1827; Dietr. Synop. Pl. **2**: 923. 1840 (as *Menicosta*).

Sabia Meniscosta Blume, Mus. Bot. Lugd.-Bat. **1**: 369. *t. 44.* 1851; Miq. Fl. Ind. Bat. **1**(2): 618. 1859, Ill. Fl. Archip. Ind. 71. *t. 31.* 1870; Backer, Schoolfl. Java 273. 1911.

Sabia Meniscosta Blume var. *firma* Blume, Mus. Bot. Lugd.-Bat. **1**: 370. 1851.

Sabia Meniscosta Blume var. *latifolia* Blume, Mus. Bot. Lugd.-Bat. **1**: 370. 1851.

Sabia elliptica Miq. Fl. Ind. Bat. Suppl. **1**: 203. 1860, 521. 1862.

Sabia Meniscosta Blume var. *elliptica* Miq. Ill. Fl. Archip. Ind. 71. 1870.

An evergreen scandent shrub, the branches and branchlets pale brown, terete, slender, striate, sparsely pubescent, becoming glabrous; bud-scales puberulent, ovate, the margins eciliate; leaves elliptic, oblong-elliptic, or ovate-oblong, 8–15 cm. long, 3.5–10 cm. wide, acute or shortly acuminate, apiculate, cuneate at base, chartaceous to subcoriaceous, glabrous on both surfaces, greenish on the upper surface, light brown beneath, the margins cartilagineous, narrowly revolute, eciliate, slightly wavy; nerves 4–6 pairs, curved-ascending, arched and joined remote from the margin, very strongly elevated beneath, not very prominent above, the veinlets loosely reticulate on both surfaces, strongly raised beneath; petioles 1–2.5 cm. long, somewhat wrinkled, glabrous; inflorescences axillary, narrowly paniculate, 6–10 cm. long, with many racemosely arranged 4–12-flowered cymes, shortly brownish-pubescent; branches or peduncles of the cymes

[1] A sterile specimen with numerous crowded, lateral, oblong-obovoid galls on the branches corresponding to very similar ones on a sterile specimen of the Indian *S. campanulata* Wall. (*Stewart 2258*).

slightly thickened upwards, 5–10 mm. long; pedicels slender, 1–2 mm. long; bracteoles pubescent, linear, 1 mm. long; flowers small, white, 5 mm. in diameter; calyx equally 5-lobed, rather densely pubescent, minutely and obscurely reddish-glandular, the lobes broadly ovate, 1 mm. long, acute or subacute, the margins ciliate; petals 5, equal, thin, elliptic-ovate to ovate-lanceolate or oblong, 2.5–3 mm. long, 1–1.5 mm. wide, obtuse, 3–5-nerved, the nerves red, fine but prominent, the margins eciliate; stamens 5, equal; filaments complanate, 1 mm. long, glabrous; anthers ovoid, 0.5 mm. long, introrse; disc cup-shaped, deeply lobed, each lobe obscurely tipped by minute indurated disciform glands; ovary ovoid or conical, glabrous; styles very short, 0.1–0.2 mm. long, glabrous; stigmas minute, rounded or capitate; carpidia suborbicular or subreniform, apparently white when fresh, 6 mm. long, 8 mm. wide, glabrous, finely scrobiculate, without persistent petals at the base.

JAVA: West Java, Bantam, Bodjongmanik, *S. H. Koorders 40805B* (B); *C. A. Backer 22081* (B), Feb., 1917, altitude 200 m.; Roempin, *Blume s.n.* (B); Batavia, Buitenzorg and vicinity, cult. *Hort. Bog. XI. B. 50* (B, P), *XVII. F. 44* (B); Koeta Pareang, *C. A. Backer 5996* (B, P), Dec. 25, 1912, altitude 400 m.; Djamboe, *C. A. Backer 23482* (B), Feb. 17, 1918, altitude 200 m.; Tjampea, without collector, *Herb. Hort. Bot. Bog. 940–5–28* (B), *R. C. Bakhuizen van den Brink 670* (B), March 20, 1918, altitude 250 m.; Laladon near Tjiomas, *R. C. Bakhuizen van den Brink 4052, 5107, 5391, 5806* (B), Aug., Jan., Feb. and Dec., 1920–1924, altitude 250–300 m.; Praeanger, Lengkong, *Doctors von Leeuwen-Reijnvaan 2871* (B), Aug. 2, 1918, altitude 575 m.; Pangerango, *Kuhl & Van Hasselt 14537* (B), altitude 1200 m.; Tjadasmalang, *W. F. Winckel 1446B* (B, C), *1604B* (B), *1680B* (C), July–Aug., 1923, altitude 1000 m.; Tjibodas, *F. Massart 774* (B, P), Jan. 26, 1895, altitude 1400 m., *Valeton s.n.* (B) in 1912; Tjigenteng, *S. H. Koorders 26249B, 26351B* (B), Jan., 1896 and 1897, altitude 1500–1700 m.; Middle Java, Banjoemas, *S. H. Koorders 34040B* (B), Aug. 24, 1900, altitude 800 m.; without locality, probably Mount Salak, *Blume s.n.* (B), apparently an isotype. SUMATRA: Without locality, *H. O. Forbes 1495* [1] (G), in 1881–1882; without collector, *Herb. Hort. Bot. Bog. 940–5–85* (B); East Coast, Kota Pinang, Saboengan, *Rahmat Si Toroes 3703* (A, C); Simeloengan, near Siantan, *H. S. Yates 1200* (A, B), *1926* (B, C, N), Jan. 31, 1926, Nov. 9, 1924, altitude 300–400 m., flowers and fruit white. BORNEO: Soergai, Boching, *Amdjah 126 = 1724* (B), Nieuwenhuis Exped., Dec. 28, 1898; Lianggagang, *H. Hallier 268 = 2599* (B), in 1893–1894.

DISTRIBUTION: Sumatra, Java, Borneo.

The genus *Meniscosta* was proposed by Blume, Bijdr. 28. 1825, on the basis of a single species, *Meniscosta javanica*. Mr. Backer is quite in order in proposing the new name *Sabia javanica* (Blume) Backer, although we have located no actual publication of this.

The species may be recognized by its narrowly paniculate elongated inflorescences, composed of many small lateral alternate 4–10-flowered cymes, the disc being deeply lobed and without indurated glands.

Three varieties were described by Blume, Mus. Bot. Lugd.-Bat. 1: 369. 1851. *Sabia Meniscosta* Blume var. *glabriuscula* Blume from Java and Sumatra was characterized by the glabrous inflorescences. The pubescence on the inflorescences is very consistent in the typical form of this species, and therefore this variety may be maintained. *Sabia Meniscosta* Blume var. *firma* Blume of Sumatra and *Sabia Meniscosta* Blume var. *latifolia* Blume of Sumatra were differentiated from the typical form of this species on the basis of the texture and

[1] King and Gamble, Jour. As. Soc. Bengal **74**(2): 12. 1905 (Mater. Fl. Malay. Penin. **4**: 222), cite *Forbes 1495* from Sumatra as representing *Psychotria tortilis* Blume = *Streblosa tortilis* Korth. of the Rubiaceae. Baker, in his treatment of Forbes' Malayan plants, Jour. Bot. **62**: Suppl. 30. 1924, lists no representatives of the genus *Sabia*, and a year later, op. cit. 53, merely notes "King and Gamble gives *1495* from hills NE. of Goenoeng Trang, 600 feet for this" [i.e. *Streblosa tortilis* (Blume) Korth.]. Our specimen of this number is *Sabia javanica* (Blume) Backer.

size of the leaves alone. *Sabia Meniscosta* Blume var. *elliptica* (Miq.) Miq. Ill. Fl. Archip. 71. 1870, based on *Sabia elliptica* Miq., was also differentiated only by its leaf-shape, and although I have not seen any authentically named specimens representing Miquel's species or variety, with rather extensive collections available, particularly from Java and Sumatra, and from my experience with other species of this genus, I do not consider it possible to maintain this or Blume's varieties (other than var. *glabriuscula*) on the basis of leaf-shape and texture alone.

48a. **Sabia javanica** (Blume) Backer var. **glabriuscula** (Blume) comb. nov.

Sabia Meniscosta Blume var. *glabriuscula* Blume, Mus. Bot. Lugd.-Bat. 1: 370. 1851.

Differs from the typical form of the species in its glabrous inflorescences, peduncles, and pedicels.

JAVA: West Java, Preanger, Tasikmalaja, Noesagede Island, Lake Pendjaloe, *Koorders 47777B, 47778B* (B), July, 1917, alt. 720 m., flowers white.

DISTRIBUTION: Java and also (fide Blume) in Sumatra.

The cited specimens fall within the limits of the variety as defined by Blume, which is distinguished from the species, as far as I have been able to determine, only by its glabrous inflorescences.

49. **Sabia pauciflora** Blume, Mus. Bot. Lugd.-Bat. 1: 370. 1851; Miq. Fl. Ind. Bat. 1(2): 619. 1859, Ill. Fl. Archip. Ind. 72. *t. 32.* 1870.

Sabia papuana Warb. in K. Schum. & Lauterb. Fl. Deutsch. Schutzgeb. Südsee 425. 1901.

An evergreen scandent shrub, the branches blackish purple to pale greenish or whitish, terete, slender, striate, glabrous; branchlets pale, terete, slender, striate, very sparsely pubescent, soon becoming glabrous; bud-scales sparsely pubescent, ovate, the margins sparsely ciliate; leaves mostly oblong-elliptic, 6–12 cm. long, 2.5–4.5 cm. wide, shortly and usually sharply acuminate, broadly acute to subrotund at base, membranaceous to chartaceous, glabrous on both surfaces or when very young slightly pubescent, greenish olivaceous to somewhat brownish on the upper surface, paler beneath, the margins narrowly cartilagineous, eciliate; nerves 7–9 pairs, curved, arched-anastomosing, prominently elevated on the lower surface, less so above, the veinlets slender, rather distinct; petioles slender, 8–11 mm. long, sparsely pubescent when young, soon becoming glabrous; inflorescences axillary and terminal, simply cymose (2–4 cm. long) or elongated and narrowly paniculate (up to 12 cm. long), with few, scattered, racemosely arranged, few-flowered cymules even on the same specimen, in the elongated inflorescences juvenile leaves sometimes subtending the cymules, at first slightly pubescent, soon becoming glabrous, the cymules 2–4-flowered, their peduncles 1–2.5 cm. long, or the uppermost flowers racemosely arranged, the pedicels 5–7 mm. long; bracteoles slightly pubescent, linear, 2 mm. long; flowers small, pale greenish, 4–5 mm. in diameter; calyx equally 5-lobed, slightly pubescent, the lobes ovate or triangular, 0.8–1 mm. long, acute; petals 5, subequal, thin, oblong or oblong-lanceolate, 3–3.5 mm. long, 1 mm. wide, 3–5-nerved, obtuse or subacute, the margins eciliate; stamens 5, subequal; filaments flat, 1.5–2 mm. long, glabrous; anthers ovoid, 0.5 mm. long, extrorse; disc cup-shaped, irregularly shallowly lobed, without indurated glands; ovary ovoid, glabrous; styles 1 mm. long, glabrous; stigmas minute, rounded; carpidia suborbicular-obovate, pinkish white, turning to red when fresh, 7–9 mm. long, glabrous, strongly scrobiculate, without persistent petals at the base.

NEW GUINEA: Papua (British New Guinea), Koitaki, *C. E. Carr 12624, 12625* (N), June 20, 1935, altitude 430 m., in forest, flowers pale green, fruit cream; Northeastern New Guinea, Morobe District, Sattelberg, Heldsbach, Ogeramnang, Boana, and Wantoat, *Clemens 106, 5422, 11076, 41760* (A), Feb. 3 and 17, 1935 and 1937, Sept. 11, 1935 and Aug. 28, 1940, alt. 100 to 1800 m.; Netherlands New Guinea, Bernhard Camp, Idenburg

River, *L. J. Brass 13076* (A), Feb., 1939, alt. 850 m. SOLOMON ISLANDS: Bougainville, Koniguru, Buin, and Kupei Gold Fields, *S. F. Kajewski 1670, 2028* (A, B), Apr. 10 and Aug. 7, 1930, alt. 850–950 m.

DISTRIBUTION: New Guinea, Solomon Islands, the type from the Moluccas.

The type of Blume's species was from the Moluccas, and *Sabia pauciflora* Blume was originally very inadequately described. In 1870 Miquel published an amplified and rather detailed description; this, together with his excellent plate indicating the inflorescences as few-flowered, the flowers "racemoso-paucifloris," suggests our New Guinea flowering material in that the few uppermost flowers are racemose, the lower ones in very few 2–4-flowered, racemosely arranged cymules. I have not seen Blume's type, nor have I seen the type of *Sabia papuana* Warb., which was a fruiting specimen from Northeastern New Guinea (Ramu River, *Lauterbach 2394*). While I would naturally prefer to base my interpretations on an actual examination of type material, I feel confident in this case that a reduction of *Sabia papuana* Warb. is indicated. Warburg did not discuss the alliances of his assumed new species. *Sabia pauciflora* Blume (*Sabia papuana* Warb.) is the most southern and eastern representative of the genus.

50. **Sabia reticulata** Elmer, Leafl. Philip. Bot. 2: 579. 1909; Merr. Enum. Philip. Fl. Pl. 2: 516. 1923.

An evergreen scandent shrub, the branches and branchlets dark brown, terete, slender, striate, glabrous; bud-scales glabrous, lanceolate, the margins eciliate; leaves lanceolate or oblong-lanceolate, 7–12 cm. long, 2.5–4 cm. wide, acuminate, shortly acute at base, obtuse or subrounded, subcoriaceous or chartaceous, glabrous on both surfaces, olivaceous to brownish on the upper surface, paler beneath, the margins cartilagineous, slightly wavy, eciliate; nerves 5 or 6 pairs, spreading, arched-anastomosing, prominently elevated on the lower surface, the veinlets evident on both surfaces but much more prominent beneath; petioles 1 cm. long, glabrous, occasionally sparsely pubescent; inflorescences axillary, solitary, glabrous, 2–7 cm. long,[1] consisting of a very few racemosely arranged, few-flowered cymules, their peduncles usually 5 mm. long or less, or the uppermost flowers of each inflorescence racemosely arranged; pedicels slender, up to 5 mm. long; bracteoles glabrous, lanceolate, 2 mm. long; flowers green or greenish white, small, 4 mm. in diameter; calyx equally 5-lobed, glabrous, the lobes ovate, 1.5 mm. long, the margins ciliate; petals 5, equal, fairly thick, narrowly ovate to elliptic-ovate, broadly acute, obtuse or rounded, 2–3 mm. long, 1 mm. wide, 5-nerved, the nerves prominent, nearly parallel, the margins eciliate; stamens 5, equal; filaments flattened, mostly 0.5–1 mm. long, glabrous; anthers minute, somewhat ovoid, 0.3 mm. long, introrse; disc cup-shaped, irregularly shallowly or deeply lobed, without indurated glands; ovary ovoid or conical, glabrous; styles 0.5 mm. long, glabrous; stigmas minute, somewhat rounded; carpidia suborbicular or subreniform, blue when fresh, 8 mm. in diameter, glabrous, with obscure scrobiculations, without persistent petals at the base.

PHILIPPINES: Luzon, Laguna Province, Paete, *C. F. Baker 3699* (P), Dec. 28, 1914; Sorsogon Province, Mount Pacdal, *M. Ramos 23593* (A, B, G, N, P, U), alt. 240 m.; Mount Bulusan, *A. D. E. Elmer 15562* (A, B, C, G, N, P, U), Dec., 1915; Catanduanes, *M. Ramos 30367* (P, U), Dec. 10, 1917, alt. 60 m.; Negros, Cuernos Mountains, *A. D. E.*

[1] Elmer says in his original description: "racemes . . . 3 to 13 cm. long . . . corolla segments about 4 mm. long, nearly 2 mm. wide and stamens 2 mm. in length." This is not true of our isotype nor of any other material that I refer to this species. The inflorescences are narrow panicles rather than simple racemes, although the uppermost flowers are often racemose, mostly 2–5 cm. long, in one specimen up to 7 cm. In mature flowers the petals are 3 mm. long at most and 1.1–1.4 mm. wide, while the stamens are 0.5–1 mm. long.

Elmer 10027, ISOTYPE (G, P), *10448* (A, B, N, U); Mindanao, Davao District, Todaya, Mt. Apo, *A. D. E. Elmer 11655* (B, N, U), Sept., 1909, alt. 1200 m.; Lanao District, *M. S. Clemens 714* (A, P, U), various dates, 1907, alt. about 700 m.

DISTRIBUTION: Philippine Islands.

This species is very closely allied to *Sabia pauciflora* Blume of the Moluccas, New Guinea, and the Solomon Islands, and may be distinguished from it only with difficulty. With more abundant material from the region south and southeast of the Philippines, I should not be surprised if some future investigator reduced this Philippine species to that originally described by Blume from the Moluccas. For the present, however, it seems desirable to retain the two as distinct.

51. **Sabia kachinica** sp. nov. **Fig. 8.**

Sabia fasciculata sensu Merr. Brittonia **4**: 111. 1941, non Lecomte.

Frutex sempervirens, scandens, ramis brunneis, teretibus, striatis, glabris, ramulis plus minusve pallide viridibus; foliis oblongis vel oblongo-ellipticis, 7.5–10.5 cm. longis, 2.5–3.5 cm. latis, acute acuminatis, basi late acutis vel obtusis,

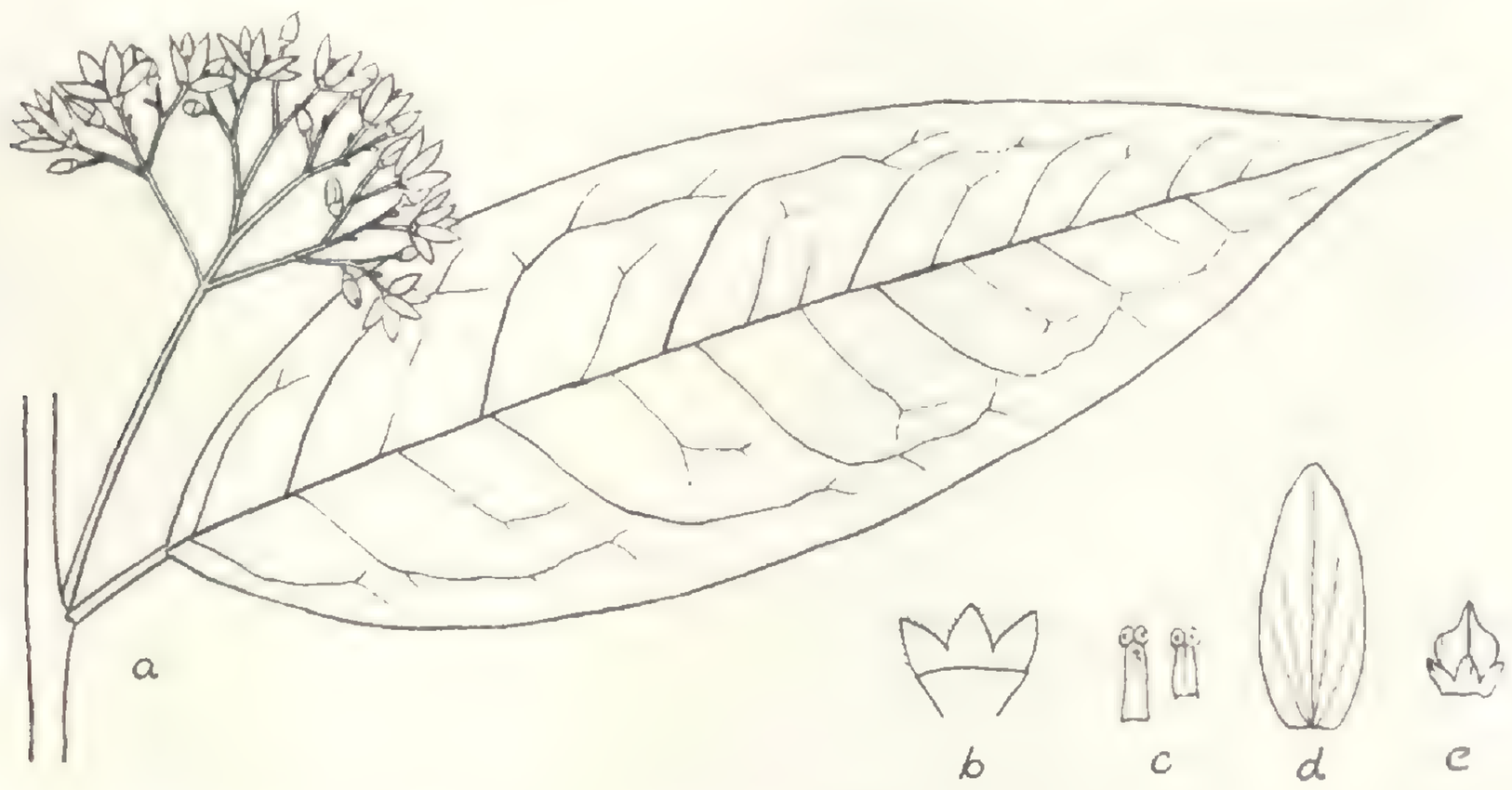

Fig. 8. *Sabia kachinica* Chen; *a*, a branch with leaf and inflorescence, × 1; *b*, calyx, *c*, stamens, *d*, petal, *e*, ovary, style and disc, all × 5.

firmiter chartaceis, utrinque nitidis, glabris, supra olivaceis vel viridibus, subtus paullo pallidioribus, margine cartilagineis, eciliatis, leviter revolutis; nervis 8 vel 9 utrinque, curvatis, arcuato-anastomosantibus, subtus perspicue elevatis, supra gracilioribus, venulis laxe reticulatis, distinctis; petiolo 6–8 mm. longo, glabro; inflorescentiis axillaribus, solitariis, longe (2–4 cm.) pedunculatis, corymboso-paniculatis, 3–4 cm. latis, glabris, 10–20-floris; pedicellis 2–3 mm. longis, gracilibus; floribus viridibus, 8 mm. diametro; calycibus glabris, lobis 5, aequalibus, ovatis, circiter 1 mm. longis, obtusis vel subacutis, margine sparse ciliatis; petalis 5, aequalibus, membranaceis, oblongo-lanceolatis vel oblongo-ellipticis, circiter 3.5 mm. longis, 1–1.3 mm. latis, 5-nerviis, acutis vel obtusis, margine eciliatis; staminibus 5, inaequalibus; filamentis complanatis, 0.7–1 mm. longis, glabris; antheris ovoideis, 0.5 mm. longis, introrsis; disco cyathiformi, irregulariter lobato, lobis 5, distinctis, oblongo-ovatis, obtusis, glandulis minutissimis induratis irregulariter disciformibus terminantibus; ovario ovoideo, glabro; stylis 0.1–0.2 mm. longis, glabris; stigmatibus minutis, subcapitatis; carpidiis ignotis.

UPPER BURMA: Kachin Hills, *F. K. Ward 9018*, TYPE (A), Dec. 3, 1930, altitude 600–1000 m., "a scrambling twiner in the jungle."

DISTRIBUTION: Burma.

This species resembles *Sabia fasciculata* Lecomte in certain aspects, but it is not closely allied to that species and may be distinguished by its much shorter styles and by its long-peduncled compound cymes that are never branched from the base.

52. **Sabia parviflora** Wall. in Roxb. Fl. Ind. **2**: 310. 1824; Spreng. Syst. Veg. **4**(*2*): 91. 1827; Wall. List No. 1001 in part, 1829; Dietr. Synop. Pl. **1**: 804. 1839; Hook. f. & Th. Fl. Ind. **1**: 210. 1855; Walp. Ann. Bot. Syst. **4**: 139. 1857; Hook. f. Fl. Brit. Ind. **2**: 4. 1879; Stapf, Trans. Linn. Soc. Bot. II. **4**: 142. 1894; H. Lév. Fl. Kouy-Tchéou, 379. 1915; Merr. Enum. Born. Pl. 362. 1921; Rehder, Jour. Arnold Arb. **15**: 10. 1934; Kanj. Kanj. Das & Purk. Fl. Assam **1**: 325. 1937; Chun, Sunyatsenia **4**: 242. 1940. **Fig. 9.**

Sabia sp. Griffith, Jour. **2**: 170. 1848, Notul. Pl. As. **4**: 423. 1854, Ic. Pl. As. *t. 568. II. 1–13.* 1854.

Sabia polyantha Hand.-Maz. Sinensia **3**: 190. 1933, syn. nov.

An evergreen scandent shrub, the branches terete, slender, striate, glabrous; branchlets terete, slender, striate, sparsely pubescent or glabrous; bud-scales glabrous, ovate, acute, the margins eciliate; leaves mostly ovate-lanceolate or oblong to oblong-elliptic, 5–12 cm. long, 2–4 cm. wide, distinctly acuminate, broadly acute to obtuse at base, chartaceous to thinly subcoriaceous, glabrous on both surfaces, pale brown to subolivaceous on the upper surface, paler beneath, the margins cartilagineous, often slightly wavy, eciliate (immature leaves sometimes slightly ciliate); nerves 5–8 pairs, rather spreading, arched-anastomosing, prominently elevated beneath, the veinlets distinct on the lower surface, rather obscure above; petioles 0.5–1 cm. long, sparsely pubescent or glabrous; inflorescences cymose, the individual cymes more or less compound, mostly 10–20-flowered, open, lax, 2–5 cm. in diameter, axillary and terminal, the cymes mostly solitary, occasionally arranged in racemes, the slender peduncles mostly 2–4 cm., sometimes up to 6 cm. long; pedicels slender, slightly thickened upward, 5–10 mm. long; bracteoles sparsely pubescent, linear; flowers greenish or greenish yellow, 4–6 mm. in diameter; calyx equally 5-lobed, glabrous, the lobes ovate to oblong-ovate, about 1 mm. long, acute or obtuse, the margins minutely ciliate; petals 5, subequal, fairly thick, oblong to broadly oblong-lanceolate, 2–3 mm. long, 0.8–1 mm. wide, acute or obtuse, 3–5-nerved, the nerves reddish, the margins eciliate; stamens 5, unequal; filaments complanate, 1–1.5 or even 2 mm. long, glabrous; anthers oblong, about 0.5 mm. long, extrorse; disc cup-shaped, irregularly and often deeply lobed, the indurated glands none; ovary subconical or ovoid, glabrous; styles about 0.5 mm. long, glabrous; stigmas minute, somewhat capitate; carpidia suborbicular or subreniform, 5–7 mm. in diameter, glabrous, with obscure scrobiculations, without persistent petals at base.

India: Sikkim, *J. D. Hooker s.n.*, alt. 860–1700 m. (G), *T. Thomson s.n.* (B), in 1857, *C. B. Clarke s.n.* (A), April 26, 1876, *G. King s.n.* (B, U), Apr. 19, 1876, *G. L. Lister s.n.* (B), April, 1878, native collector, *Calcutta Bot. Gard. 1107* (P), Apr. 21, 1909, without collector in 1874, *Herb. Hort. Bot. Bog. 940.5.61* (B); Assam, Khasi Hills and Brahmaputra Plain, *Herb. S. Kurz s.n. Herb. Hort. Bot. Bog. 940.5.59* (B), without locality, collector and number (Meisner Herbarium) (N). China: Yunnan, Mengtze, *A. Henry 10400* (A, N, U), *10400A* (A), *10400B* (A, P, U), *10400D* (A, P), alt. 5000 feet; Szemao, *A. Henry 11987A* (A), alt. 400 feet; Chengkiang, *Y. Tsiang & H. Wang 16282* (A), March–May, 1939, alt. 1800–2000 m.; Lan-Tsang Hsien, *C. W. Wang 76439, 76506* (A), May, 1936, alt. 1500–1700 m.; Wen-Shen Hsien, *H. T. Tsai 51713* (A), Feb. 8, 1933, alt. 1600 m.; Lu-se, *H. T. Tsai 56968* (A), Feb. 20, 1934, alt. 1550 m.; Shang-pa, *H. T. Tsai 58757* (A), Oct. 12, 1934, alt. 2800 m.; Ping-pien Hsien, *H. T. Tsai 55142, 55358, 55461, 60043, 60575, 61450, 62284* (A), May–June, 1934, alt. 1200–1400 m.; without locality, *G. Forrest 7512, 9816* (A), *H. T. Tsai 60672* (A), in 1934; Kweichow, Chenfeng, *S. W. Teng 90865, 91041* (A), Sept. 13 and 24, 1936; Kwangsi, Bian Chen, *R. C. Ching 6720*, isotype of *Sabia polyantha* Hand.-Maz. (L, N), Aug. 5, 1928, alt. 3000 feet, *R. C. Ching 6718* (L, N),

Aug. 5, 1928, alt. 2800 feet; Lui Yuin Hsien, *A. N. Steward & C. C. Cheo 503, 578* (A, B, N), May 24, June 3, 1933, alt. 1000 m. INDO-CHINA: Tonkin, *A. Pételot 4433* (N, U), Aug., 1933, alt. 1300 m., *5443* (A, N), April, 1935, alt. 1450 m. BRITISH NORTH BORNEO: Mount Kinabalu, Penibukan, *J. & M. S. Clemens 40803* (A, U), Oct. 19, 1933, alt. 5000–6000 feet; Tenompok, *J. & M. S. Clemens 29640* (A, B, N, P), May 10, 1932, alt. 3000–4000 m.

DISTRIBUTION: India, China (Yunnan, Kweichow, Kwangsi), Indo-China, Borneo.

This species is in general distinguished by its slenderly peduncled, lax, rather many-flowered cymes and its obscurely and minutely reddish-glandular ovaries. It is widely distributed, extending from Sikkim in India eastward to Yunnan,

Fig. 9. *Sabia parviflora* Wall.; *a,* a leafy branch with inflorescences, × 1; *b,* calyx *c,* stamens, *d,* petals, *e,* ovary, style and disc, all × 5.

Kweichow, and Kwangsi in China and southward to Indo-China and British North Borneo.

Griffith's *Sabia* sp. is reduced from an examination of his illustration and description, as the characters indicated by him conform to those of Wallich's species. I have seen no specimens collected by him. *Ching 6720,* an isotype of *Sabia polyantha* Hand.-Maz., conforms fairly well with our Indian material and the published descriptions, and accordingly I do not hesitate to reduce Handel-Mazzetti's species; he compared it with *Sabia lanceolata* Colebr. and *S. Swinhoei* Hemsl. but not with *Sabia parviflora* Wall.

52a. **Sabia parviflora** Wall. var. **nitidissima** H. Lév. Fl. Kouy-Tchéou 379. 1915; Rehder, Jour. Arnold Arb. **15:** 10. 1934.

Celastrus Esquirolii H. Lév. Rep. Sp. Nov. **13:** 262. 1914.

The variety differs from the typical form of the Indian species by its larger leaves, 10–18 cm. long, 2.5–5 cm. wide, ovate-oblong, lanceolate-oblong or lanceolate, lustrous on the upper surface and less lustrous beneath, the nerves often more prominent and more numerous, often up to 10 pairs.

China: Kweichow, without locality, *J. Esquirol s.n.*, August, 1905 (holotype of *Celastrus Esquirolii* H. Lév. and *Sabia parviflora* var. *nitidissima* H. Lév., merotype A); Lo-fou, *J. Cavalerie 3415*, fragment and photo. (A), August, 1909; route de Mou-you-se à Kouan-lin, *J. Cavalerie 3919*, fragment and photo. (A), July 25, 1912; Yunnan, Feng Chen Lin Mountain, south of the Red River near Mengtze, *A. Henry 10400C* (A, N), alt. 2100 m.; Kien-shuei Hsien, *H. T. Tsai 53345* (A), May 7, 1933, alt. 1600 m. Siam: Region of Chieng Rai, Chiengmai Province, upper slopes of Doi Chang Mountain, *J. F. Rock 1774* (A, C, U), Jan. 11, 1922, alt. from 1260 to the summit 1765 m. Burma: Southeastern Shan States, Keng Tung Territory, between Ban Yang Kha and Pang Hoi Phi Bang, Valley of the Meh Len, *J. F. Rock 2202* (A, C, U), Jan. 30, 1922.

Distribution: China (Kweichow, Yunnan), Siam, Burma.

52b. **Sabia parviflora** Wall. var. **Harmandiana** (Pierre) Lecomte, Bull. Soc. Bot. Fr. **54**: 673. 1907, *in nota*, Fl. Gén. Indo-Chine **2**: 2. 1908, *in nota*.

Sabia Harmandiana Pierre, Fl. For. Cochinch. **5**: *pl. 360B*. 1897; Craib, Fl. Siam. Enum. **1**: 340. 1926.

Sabia parviflora sensu Lecomte, Fl. Gén. Indo-Chine **2**: 2. *t. 1*, 1908, vix Wall.

Differs from the typical form of Wallich's species, as far as I can determine, only by its constantly but often only very sparsely pubescent inflorescences.

China: Yunnan, Szemao, *A. Henry 11987* (A, N), alt. 1200 m.; watershed of the Black River, or Papienho, between Mohei and Maokai, *J. F. Rock 2905* (A, C, U), Mar. 20, 1922, alt. 1500 m.; Fo-Hai, *C. W. Wang 74401* (A), June, 1936, alt. 1530 m.; Lan-Tsang Hsien, *C. W. Wang 76413* (A), May, 1936, alt. 1600 m.; Shunning, *T. T. Yü 16308, 16507* (A), June 16–25, 1938, alt. 1600–1900 m. British North Borneo: Mount Kinabalu, Tenompok, *J. & M. S. Clemens 28149* (A, B, N), *28493, 28755, 34092* (A, B), January, February, March, July, 1932, alt. 5000 feet.

Distribution: China (Yunnan), Indo-China (fide Lecomte), Siam (fide Craib), Borneo.

The treatment of *Sabia Harmandiana* Pierre by Lecomte, Fl. Gén. Indo-Chine **2**: 2. 1908, is not altogether clear, as this binomial is at first listed by him as a straight synonym of *Sabia parviflora* Wall. on page 2; but on page 3 he states: "La plante désignée par Pierre sous le nom de *S. Harmandiana* n'est que la variété *Harmandiana* de l'espèce précédente [*Sabia parviflora* Wall.] dont elle diffère seulement par la plus grande taille des feuilles et la pilosité de l'inflorescence." It is clear, however, from his comment in Bull. Soc. Bot. Fr. **54**: 673. 1907, that he actually meant Pierre's species to stand as a variety. Craib, Fl. Siam. Enum. **1**: 340. 1926, accepted *Sabia Harmandiana* Pierre as a valid species on the basis that it has somewhat larger leaves and that its inflorescence is constantly hairy, *Sabia parviflora* Wall. being glabrous. In my opinion this form is scarcely worthy of specific rank and I retain it as a very weak variety of *Sabia parviflora* Wall. The pubescence on the inflorescences is sparse and is never very conspicuous. Pierre's figure of the ovary and disc, reproduced also by Lecomte, shows the disc-lobes relatively longer than in any flowers I have examined; their length is probably exaggerated.

The Borneo specimens, *Clemens 28149, 28493, 28755, 34092*, that I refer here have the very young leaves somewhat pubescent, while the inflorescences are somewhat more pubescent than in our Indo-Chinese specimens that I accept as representing typical *Sabia parviflora* Wall. var. *Harmandiana* (Pierre) Lecomte. The flowers of the Bornean specimens are quite the same as those from Indo-China. For the present I am content to treat the cited Bornean specimens as belonging to *Sabia parviflora* Wall. var. *Harmandiana* (Pierre) Lecomte.

53. **Sabia philippinensis** C. B. Robinson, Bull. Torrey Bot. Club **35**: 70. 1908; Merr. Enum. Philip. Fl. Pl. **2**: 516. 1923.

An evergreen, glabrous, scandent shrub, the branches terete, grayish to brownish or purplish brown, striate; branchlets terete, slender, flexuous, striate, pale yellowish green to brownish; bud-scales minute, glabrous, ovate, shortly acute or obtuse, the margins eciliate; leaves coriaceous or somewhat chartaceous, lanceolate to oblong-lanceolate, usually 3–7 cm. (rarely up to 9 cm.) long, 1–2.5 cm. (sometimes 3 cm.) wide, acute or acuminate and usually mucronate, acute to obtuse at base, the upper surface pale greenish olivaceous to dark brown-olivaceous, the lower surface paler, the margins cartilagineous, slightly wavy, eciliate; primary veins on each side of the midrib 7–12, spreading at nearly right angles, arched-anastomosing, distinctly elevated and prominent on the lower surface as are the distinct primary reticulations; petioles glabrous, 6–10 mm. long, slender; cymes solitary, mostly axillary or axillary and terminal, peduncled, 2–4 cm. long, subcompound, 1–2 cm. in diameter, 4–10-flowered; peduncles slender, 1–3 cm. long; pedicels slender, 2–4 mm. long; bracteoles sparsely pubescent, linear, 1 mm. long, acute, the margins minutely ciliate; flowers pale green to white or yellowish green, small, about 4 mm. in diameter; calyx equally 5-lobed, glabrous, the lobes ovate, about 1 mm. long, acute or obtuse, the margins minutely ciliate; petals 5, equal, ovate to oblong, with 5 prominent nerves, about 2 mm. long, 1–1.3 mm. wide, obtuse, rounded or rarely subacute, the margins eciliate; stamens 5, slightly unequal; filaments 1–1.5 mm. long, comparatively thick; anthers minute, ovoid, about 0.5 mm. long, introrse; disc cup-shaped, distinctly lobed, the lobes small, acute, without indurated glands; ovary ovoid; styles very short or none, never more than 0.2 mm. long, glabrous; stigmas minute, rounded; fruit unknown.

PHILIPPINES: Luzon, Ilocos Norte Province, Mt. Nagapatan, *M. Ramos 33240* (N, P), Aug. 8, 1918; Province of Abra, Mt. Posuey, *M. Ramos 26973* (A, B, P, U), Feb. 5, 1917; Bontoc Subprovince, Mt. Caua, *M. Ramos & G. Edaño 37994* (A, B, P, U), Mar. 4, 1920; Benguet Province (or Subprovince), Baguio, *A. D. E. Elmer 5866* (A, B, P, U), *8420, 8587* (A, B, N, U), Mar. 11, 1904 and March, 1907, *R. S. Williams 1445*, TYPE (N), isotype (P, U), Nov. 8, 1904, *E. D. Merrill 7708* (U), May, 1911; Mount Ugo, *M. Ramos 5822* (P, U), Dec. 19, 1908; Pauai, *J. K. Santos 31674* (A, B, P), May 10, 1918, *M. Ramos & G. Edaño 45052* (A, C, N, P), Mar. 12, 1925, in forests, alt. 1500–2300 m.

DISTRIBUTION: Philippines.

Robinson described the fruit as baccate, 1.5 cm. long and nearly 1 cm. in diameter, tipped by the persistent stigma, 2-celled. The fruits on the type specimen impress me as being abnormal, apparently due to having been stung by an insect, and I have hence ignored them in my description. The two on the holotype, one attached, are ovoid, equilateral, smooth, fleshy when fresh, and internally entirely modified, the pericarp being fleshy and much thickened; they are crowned by small imbricate scale-like appendages which surround the very obscure styles. All the other specimens examined are in anthesis, none having fruits. The species is not allied to *Sabia Swinhoei* Hemsl., to which Robinson compared it, but is very close to *Sabia parviflora* Wall. One outstanding character appears to be the almost entire absence of the style. The floral, anatomical, and pollen characters are wholly those of *Sabia*.

DOUBTFUL AND EXCLUDED SPECIES

SABIA ACUTISEPALA Stapf (err. "Dunn") ex Anon. Acta Phytotax. Geobot. **5**: 78. 1936, in clavis Japonice, *nomen nudum*.

The only specimen in the species cover at Kew is *Henry 5265* from Changyang, Hupeh, which Lecomte had determined as representing *Sabia purpurea* Hook. f. & Th. Stapf added: "Certe non *Sabia purpurea*." Of this I have seen

only a flower and a photograph of the type sheet, and I can express no opinion as to the validity and relationship of the proposed species. It apparently belongs in the section *Pachydiscus*. The binomial appears in botanical literature merely as a *nomen nudum*.

SABIA CAVALERIEI H. Lév. Rep. Sp. Nov. **9**: 456. 1911.

This species was based on *J. Cavalerie 22 bis* from Kweichow and was correctly reduced by Rehder, Jour. Arnold Arb. **14**: 224. 1933, to *Orixa japonica* Thunb. of the Rutaceae.

SABIA DENSIFLORA Miq. Fl. Ind. Bat. Suppl. **1**: 520. 1862.

This species, based on a specimen from Sumatra, was reduced by Koorders and Valeton to *Meliosma angulata* Blume, Meded. Lands Plant. **61**: 131. 1903 (Bijdr. Boomsoort. Java **9**: 131), *Meliosma* being another genus of the Sabiaceae.

SABIA EDULIS H. Lév. Fl. Kouy-Tchéou 379. 1915, *nomen nudum.*

Based on *J. Cavalerie 2033,* in part, *3904, 3932,* from Kweichow, and reduced by Rehder, Jour. Arnold Arb. **15**: 2. 1934, in part to *Iodes ovalis* Blume and in part to *Iodes Seguini* (H. Lév.) Rehder, of the Icacinaceae.

SABIA ESQUIROLII H. Lév. Rep. Sp. Nov. **9**: 457. 1911.

Based on *J. Esquirol 416* from Kweichow, and correctly reduced by Rehder, Jour. Arnold Arb. **15**: 309. 1934, to *Gardneria multiflora* Nakai of the Loganiaceae.

SABIA FEDDEI H. Lév. Rep. Sp. Nov. **9**: 456. 1911.

Based on *J. Cavalerie 23 bis* from Kweichow, and correctly reduced by Rehder, Jour. Arnold Arb. **14**: 224. 1933, to *Orixa japonica* Thunb. of the Rutaceae.

SABIA ? FLORIBUNDA Miq. Fl. Ind. Bat. Suppl. **1**: 520. 1862.

This species, based on specimens from Sumatra, was reduced to *Meliosma angulata* Blume by Koorders and Valeton, Meded. Lands Plant. **61**: 131. 1903 (Bijdr. Boomsoort. Java **9**: 131).

SABIA VIRIDISSIMA Kurz, Jour. As. Soc. Bengal **41**(*2*): 304. 1872.

Kurz's species was based on material from the Andaman Islands and is the basis of *Blachia viridissima* (Kurz) King, Jour. As. Soc. Bengal **65**(*2*): 455. 1896 (Mater. Fl. Malay. Pen. **2**: 741.), *in nota,* of the Euphorbiaceae. King states that Kurz's specimens, in part, represent *Erythropalum scandens* Blume, of the Olacaceae, but his description seems safely to have been based wholly on the euphorbiaceous plant. Incidentally, *Blachia viridissima* (Kurz) King was overlooked by the compilers of the supplements to Index Kewensis, while Pax and Hoffmann, Pflanzenr. **47**(IV. 147. III): 36–39, 1911, in their monographic treatment of the seven known species of *Blachia,* fail to account for it. *Blachia viridissima* (Kurz) King differs from the single other Andaman Islands species, *B. andamanica* Hook. f., by its paniculate inflorescences, its 3-cleft styles, and its membranaceous, obovate, or elliptic-lanceolate leaves.

SABIA ROTUNDATA Stapf (err. "Dunn") ex Anon. Acta Phytotax. Geobot. **5**: 77. 1936, *nomen nudum.*

There are two specimens in the species cover at Kew, *Wilson 3141* (Veitch Expedition), May, 1904, and *Wilson 329* from Patung, Hupeh, April, 1900, both described as scandent and with brownish flowers. No. *3141* was determined by Lecomte as representing *Sabia yunnanensis* Franch. I have seen no material of

Wilson 329, while the Arnold Arboretum specimen of *Wilson 3141* is wholly inadequate, having only a few very immature leaves and two immature flower-buds. The species, whatever it may prove to be, is clearly a deciduous one, but I can not place it on the basis of the fragmentary and incomplete material available to me. In Stapf's manuscript key it is contrasted to *Sabia emarginata* Lecomte thus: "Sepals truncate or emarginate: young leaves quite glabrous. . . . *S. emarginata*" and "Sepals rounded: leaves with a very few minute appressed hairs or glabrous . . . *Sabia rotundata,*" both being placed under a division "Flowers precocious on short shoots with the young leaves; peduncles rather short." Like *Sabia acutisepala* Stapf, this binomial appears in botanical literature only as a *nomen nudum*.

List of cited specimens

All specific names pertain to *Sabia*.

Ahmad (India) 35 paniculata.
Amdjah (Borneo) 126 = 1724 javanica; 883 racemosa.
Backer (Java) 5996, 22081, 23482 javanica.
Baker (Philippines) 3699 reticulata.
Bakhuizen van den Brink (Java) 670, 5107, 5391 javanica.
Bis Ram (India) 249 paniculata; 364 campanulata; 2302 paniculata.
Biswas (India) 1694 paniculata.
Blume (Java) s.n. javanica.
Boeea (Sumatra) 7127 sumatrana.
Brass (New Guinea) 13076 pauciflora.
Bünnemeijer (Sumatra) 4926 limoniacea.
Carr (New Guinea) 12624, 12625 pauciflora.
Chen (China) 970 Swinhoei.
Cheng (China) 4507 japonica.
Cheo & Wilson (China) 12823 japonica.
Ching (China) 1722 discolor; 1764, 2391, 3409 gaultheriifolia; 2006 Swinhoei var. subcorymbosa; 5792 fasciculata; 6718, 6720 parviflora; 7603 limoniacea var. ardisioides; 20231 Croizatiana; 20685 yunnanensis var. Mairei.
Ching & Tso (China) 496 japonica.
Choudhury (India) 39 paniculata.
Chow (China) 313, 323, 654 Schumanniana.
Chun, N. K. & Tso (China) 44350, 44390, 44767 limoniacea var. ardisioides.
Chun, W. Y. (China) 6673 limoniacea var. ardisioides.
Chun, Y. F. (China) 30475 limoniacea var. ardisioides.
Chung (China) 3191, 6635 Swinhoei; 3276 discolor; 3409 gaultheriifolia; 8023, 8043 japonica.
Chung & Sun (China) 627, 735 gaultheriifolia.
Clarke (India) 18005 limoniacea; 26933 leptandra; 37314 lanceolata.
Clemens, M. S. (New Guinea) 106, 5422, 11076 pauciflora; (Philippines) 714 reticulata.
Clemens, J. & M. S. (Borneo) 28149, 28493, 28755, 34092 parviflora var. Harmandiana; 29640, 34092, 40803 parviflora; 26192, 30374, 30375, 30631 racemosa.
Craib (India) 4700 leptandra.
Dickason (Burma) 7480 falcata.
Drummond (India) 2023, 21451 campanulata.
Ducloux (China) 6, 104 bicolor; 117 yunnanensis var. Mairei.
Dunn (Hongkong Herb.) 2533 Swinhoei; 2534 coriacea; 2535 japonica; 2536, 2537 discolor; 2538 limoniacea var. ardisioides.
Elmer (Philippines) 5866, 8420, 8587 philippinensis; 10027, 10448, 11655, 15562 reticulata.
Faber (China) s.n. japonica.
Fan & Li (China) 82 japonica.
Fang (China) 1327, 2178 gracilis; 1388 puberula; 2178 Schumanniana var. longipes.
Feng (China) 746, 817, 962 yunannansis var. Mairei; 792, 1065 yunnanensis; 1834 glandulosa.
Forbes (Sumatra) 1495 javanica.

FORREST (China, Burma) 2096 pp., 4721, 4726 yunnanensis; 4707, 19379 Croizatiana; 5574 yunnanensis var. Mairei; 7512, 9816 parviflora; 8469, 9569, 9717, 21091 dumicola; 17799 fasciculata; 21472 angustifolia.
FU (China) 79 Swinhoei.
GAMBLE (India) 24549 paniculata.
GILL (India) 414 paniculata.
GRESSITT (China) 1249 discolor; 1718 coriacea.
GRIFFITH (India) 111, 331 lanceolata.
HALLIER (Borneo) 268a = 2599 javanica.
HANCE (China) 5230 limoniacea var. ardisioides.
HANDEL-MAZZETTI (China) 87 heterosepala; 103 Swinhoei; 1066 yunnanensis.
HASSI (India) 50 paniculata.
HENRY (China) 3460, 3460A, 4181 Swinhoei; 4045 puberula; 5265 acutisepala; 5314 emarginata; 5421, 5421B, 6114 Schumanniana; 6022, 6227, 7240 gaultheriifolia; 6290 puberula var. hupehensis; 6780 Ritchieae; 10250 olacifolia; 10400, 10400A, 10400B, 10400D parviflora; 10400C parviflora var. nitidissima; 10487 fasciculata; 10496, 10529, 10529A, 11987A pallida; 11987 parviflora var. Harmandiana.
HOOKER (India) s.n. parviflora; s.n. leptandra; s.n. campanulata.
HOOKER & THOMSON (India) s.n. limoniacea; s.n. purpurea; s.n. lanceolata.
HOW (China) 72090 limoniacea var. ardisioides.
HU (China) 869 japonica; 946 discolor.
JENKINS (India) s.n. limoniacea; s.n. lanceolata.
KAJEWSKI (Solomon Islands) 1670, 2028 pauciflora.
KENG (China) 565, 622 japonica.
KING (India) 5105, s.n. leptandra; s.n. parviflora.
KING'S COLLECTOR (Malay Peninsula) 2217 sumatrana.
KOELZ (India) 1470, 1775 campanulata.
KOORDERS (Java) 26248, 26351, 34040, 40850 javanica; 47777, 47778 javanica var. glabriuscula.
KORTHALS (Sumatra) s.n. sumatrana.
KUHL & VAN HASSELT (Java) 14537 javanica.
KUNTZE (India) 6830 leptandra.
KURZ (herb.) (India) s.n. lanceolata; s.n. parviflora.
LAU (China) 828, 2526 limoniacea var. ardisioides; 2718 coriacea; 4152 japonica var. sinensis; 4464 japonica; 25751 Swinhoei var. hainanensis; 28443 fasciculata.
LIANG (China) 64692, 64694 limoniacea var. ardisioides.
LING (China) 7825, 12400, 12426 japonica.
LISTER (India) s.n. parviflora.
MAIRE (China) 281 yunnanensis; 326, 335, 3639, 3839 Croizatiana; 357, 3320 Rockii; 541, 1489 yunnanensis var. Mairei; s.n. Schumanniana.
MANN (India) s.n. lanceolata.
MASSART (Java) 774 javanica.
MAXIMOWICZ (Japan) s.n. japonica.
MCCLURE (China) 6480 Swinhoei; 6754 discolor; 8704 limoniacea var. ardisioides.
MEEBOLD (India) 6119 lanceolata.
MERRILL (Philippines) 7708 philippinensis; (China) 10745 Swinhoei; 11438 japonica.
MEYER (China) 1539 Swinhoei.
MOKIM (India) 60 paniculata.
NANKING UNIV. (China) 1590 japonica.
NATIVE COLLECTOR (Calcutta Bot. Gard.) (India) 1107 parviflora.
NORTON (China) 1477 Swinhoei.
PARKER (India) 3055, s.n. campanulata.
PENG (China) 8759 limoniacea var. ardisioides.
PÉTELOT (Indo-China) 1774, 2182, 2183, 3069, 3793 olacifolia; 4433, 5443 parviflora; 4531 fasciculata.
PRAIN'S COLLECTOR (India) 346 lanceolata; 415, 626 limoniacea.
PUNJ (India) 36 paniculata.
PURDOM (China) 894 shensiensis.
QURESHI (India) 28 campanulata.
RAMOS (Philippines) 5822, 26973, 33240 philippinensis; 23593, 30367 reticulata.
RAMOS & EDAÑO (Philippines) 37994, 45052 philippinensis.
RAWAT (India) 34 paniculata.

ROCK (China, Siam, Burma) 1774, 2202 parviflora var. nitidissima; 2905 parviflora var. Harmandiana; 3114 p. p., 4243, 4793 yunnanensis; 3114 p. p., 3120, 3531, 3672, 3732 yunnanensis var. Mairei; 8334 Rockii; 24718 Croizatiana.
RUSE (India) 5 purpurea.
SAKURAI (Japan) s.n. japonica.
SANTOS (Philippines) 31674 philippinensis.
SCHLAGINTWEIT (India) 472 lanceolata.
SCHNEIDER (China) 637, 998, 1261, 2987 yunnanensis.
SCORTECHINI (Malay Peninsula) s.n. sumatrana.
SIMONS (India) s.n. lanceolata.
SIN (China) 9799 discolor.
SINGH, R. C. (India) 54 paniculata.
SINGH, U. (India) 172 paniculata.
STEWARD & CHEO (China) 171, 712 brevipetiolata; 503, 578 parviflora; 889 Swinhoei var. subcorymbosa.
STEWART (India) 2026, 2258, 12099, 13112, s.n. campanulata.
STRACHEY & WINTERBOTTOM (India) 1, 3 campanulata; 2 paniculata.
TAAM (China) 54 Swinhoei.
TASHIRO (Japan) s.n. japonica.
TEN (China) 357 Croizatiana; 544 yunnanensis var. Mairei.
TENG (China) 90865, 91041 parviflora.
THOMSON (India) s.n. parviflora; s.n. leptandra; s.n. campanulata.
TO (China) 2806 japonica; 8759 limoniacea var. ardisioides.
TO, TSANG & TSANG (China) 12787, 12847 japonica.
TOROES (Sumatra) 3703 javanica.
TSAI (China) 50982 Schumanniana; 51629, 51660, 51695, 51755, 51904, 55103, 57017, 60613, 60821 fasciculata; 51713, 55142, 55358, 55461, 56968, 58757, 60063, 60575, 60672, 61450, 62284 parviflora; 53037 Croizatiana; 53116, 60912, 60982, 61010, 62823 olacifolia; 53345 parviflora var. nitidissima; 54582, 55007 Metcalfiana; 55528 dumicola; 57011 yunnanensis var. Mairei; 57022 acuminata; 57132, 57267, 57328 callosa; 62774 Dielsii; 62875 pentadenia.
TSANG (China) 20203, 20312, 22698, 26232 Swinhoei; 20633, 21223, 25026, 25159, 28579 discolor; 21362, 25510 coriacea; 22201, 24041, 24415 limoniacea var. ardisioides; 28146, 23657 japonica; 26254 japonica var. sinensis.
TSANG & WONG (China) 14575 limoniacea var. ardisioides.
TSIANG (China) 1681 limoniacea var. ardisioides; 4630 brevipetiolata; 5072, 5306, 6155 gracilis; 9952 japonica; 10082 Swinhoei; 41415 bicolor.
TSIANG & WANG (China) 16281 bicolor; 16282 parviflora.
TSO (China) 20387, 20689 limoniacea var. ardisioides; 20434 discolor; 20930 japonica var. sinensis; 21068 fasciculata.
TSOONG, K. K. (China) 3273 p. p. japonica; 3434 Swinhoei.
TSOONG, T. S. = CHUNG, Z. S. (China) 81700 japonica.
TSUI (China) 388 discolor; 402 limoniacea var. ardisioides; 679 japonica var. sinensis.
VALETON (Java) s.n. javanica.
WALLICH (India) 1001 p. p. parviflora; 1001 p. p. purpurea; 1002 campanulata.
WANG, C. (China) 35676, 25930 limoniacea var. ardisioides; 39425, 40326 fasciculata; 40857 Wangii.
WANG, C. W. (China) 71939, 72476, 72531 dumicola; 74401, 76413 parviflora var. Harmandiana; 76439, 76506 parviflora; 79409, 79501, 80118, 81027 limoniacea.
WANG, F. (China) 23045 Schumanniana.
WANG, F. T. (China) 20846 omeiensis.
WANG, H. (China) 41415 bicolor.
WANG & LING (China) 7437 limoniacea var. ardisioides.
WARD (Burma) 376 fasciculata; 9018 kachinica.
WILLIAMS (Philippines) 1445 philippinensis.
WILSON (China, Japan, Formosa, India) 184 Swinhoei var. subcorymbosa; 329 rotundata; 582, 2534 Schumanniana var. pluriflora; 818, 2530, 2531 latifolia; 860 Schumanniana; 1728 emarginata; 2529 Schumanniana var. longipes; 2532, 4806 gracilis; 2533, 6780 Ritchieae; 2534A, 2534B puberula; 3141 rotundata; 6139, s.n. japonica; 10035, 10936 transarisanensis; s.n. leptandra.
WINCKEL (Java) 1446, 1604, 1680 javanica.
WINKLER (Borneo) 2948 racemosa.

WONG, H. D. (China) 7437 limoniacea var. ardisioides.
WONG, Y. K. (China) 527 limoniacea var. ardisioides.
YATES (Sumatra) 1200, 1926 javanica.
YÜ (China) 253, 837 gracilis; 382, 613, 662, 779 omeiensis; 5231 pubescens; 10023, 15975 Yuii; 15500 yunnanensis var. Mairei; 16171 acuminata; 16308, 16507 parviflora var. Harmandiana; 16821 olacifolia; 17082 parvifolia.

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THE CHINESE AND INDO-CHINESE SPECIES OF ORMOSIA

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Ormosia was proposed and described by Jackson in 1811,[1] based on three species from British Guiana and the West Indies, *Ormosia coccinea* Jacks., *O. dasycarpa* Jacks., and *O. coarctata* Jacks. The genus may be typified by the first species; the other two are safely congeneric with it, and of these *O. dasycarpa* Jacks. is a synonym of the West Indian *Ormosia monosperma* (Sw.) Urban. These species are all characterized by having red seeds with a small or large black spot, a character that holds for many of the American species, but which appears in only a very few Old World species, *Ormosia macrodisca* Baker and *O. gracilis* Prain of the Malay Peninsula, and *O. Clementis* Merr. of the Philippines. Since the genus was proposed, between ninety and one hundred species have been described from tropical America, the tropical and subtropical parts of Asia, and from Malaysia and Africa. About half of these were based on material originating in the Old World, eleven from China alone. Eliminating those species which were later found to represent genera other than *Ormosia* and those that have legitimately been reduced to synonymy within *Ormosia,* there remain about seventy-five species of the genus that are currently accepted as valid. Adding the eighteen species described as new in this paper brings the total of reasonably valid species to over ninety, as the genus is now constituted. This is in rather striking contrast to the situation up to nearly the end of the last century, for in 1865 Bentham's estimate for the entire world was eighteen species, which Taubert increased to about twenty in 1892.

Recent extensive explorations in southern, southwestern, and western China have greatly increased the herbarium resources of the Arnold Arboretum, and in the collections received a considerable number of species of *Ormosia* are represented. It was therefore considered expedient to attempt a general revision of the Chinese species of the genus. For convenience we have also included the Indo-Chinese species, eight having been previously recorded from that country, this number being now increased to twelve; of these twelve species six are endemic, as far as now known, while six extend to China. We have also included the single Formosan species.

Ormosia Jackson is accepted without question as the proper generic name for this group. Clearly the older *Toulichiba* Adanson, Fam. 2: 326. 1763, is a synonym of *Ormosia,* as Plumier's illustration, on which Adanson's name was wholly based, represents the West Indian *Ormosia monosperma* (Sw.) Urban, and *O. dasycarpa* Jacks. is a synonym of that species. As Adanson's generic name was published without a binomial, and as no binomials have ever appeared under it, no reason exists for its acceptance in preference to *Ormosia* Jackson; in any case *Ormosia* Jackson (1811) is conserved against *Toulichiba* Adanson (1763) under the provisions of the International Code of Botanical Nomenclature, ed. 2, 98. 1935.

[1] **Jackson, G.** An account of Ormosia, a new genus of decandrous plants belonging to the natural order Leguminosae. Trans. Linn. Soc. **10:** 358–362. *t. 25–27.* 1811.

Macrotropis de Candolle, Prodr. 2: 98. 1825, was placed as a synonym of *Ormosia* Jackson by Bentham and Hooker f., Gen. Pl. 1: 556. 1865, but is better placed under *Sophora* Linn. Its basis was *Anagyris* sensu Loureiro, non Linn. Of the two species assigned to it by de Candolle, *Anagyris foetida* Lour. = *Macrotropis foetida* DC. is a synonym of *Sophora japonica* Linn., according to Merrill, Trans. Am. Philos. Soc. II. 24(2): 193. 1935, while *Anagyris inodora* Lour. = *Macrotropis inodora* DC., a species of somewhat doubtful status, very likely based on flowers of one species and fruits of another, appears in part to be a *Sophora,* probably *S. japonica* Linn. Merrill, l.c., calls attention to the fact that the Annamese name, given by Loureiro as *cay-hay,* is clearly a cognate form of *cay-hoe,* listed by Gagnepain as the name of *Sophora japonica* Linn. Merrill left the species as doubtfully representing a *Sophora,* thinking this not an impossible reduction if one excludes Loureiro's fruit description. It may be noted in passing that the one species of *Ormosia* that Loureiro did describe was placed by him in the totally unrelated genus *Cynometra, C. pinnata* Lour. = *Ormosia pinnata* (Lour.) Merr. It would be rather strange if Loureiro, having fruiting specimens of the material he placed in *Anagyris,* would have overlooked the red seeds had either of his species actually been an *Ormosia;* he did note this red seed character for the species he described as *Cynometra pinnata.*

Prain, Jour. As. Soc. Bengal 69(2): 175. 1900 (Bot. Notes Pap. 385–396. 1901), in excluding *Macrotropis* DC. (*Anagyris* sensu Lour., non Linn.) from the synonymy of *Ormosia* Jackson, calls attention to the fact that the keel characters assigned to *Anagyris* by Loureiro are not those of *Ormosia,* a point that Miquel had already noted in accepting *Macrotropis* as the generic name for certain Malaysian species which prove to belong in *Ormosia,* for which he proposed the sectional name *Amacrotropis. Macrotropis* sensu Miquel, Fl. Ind. Bat. Suppl. 294. 1861, non DC., is a synonym of *Ormosia* Jackson.

Layia Hooker & Arnott, Bot. Beechey Voy. 182. 1833, with a single species, *Layia emarginata* Hook. & Arn., is *Ormosia* as the latter genus is currently interpreted. The generic name *Layia* Hooker & Arnott has a curious history, having been proposed informally for a genus of the Compositae and formally for a genus of the Leguminosae in the same work. The leguminous *Layia* Hooker & Arnott, which was formally published, is properly disposed of as a synonym of *Ormosia* Jackson. But its formal publication actually invalidated the synantherous genus *Layia* Hooker & Arnott, which is currently accepted by all modern authors for a group of about twenty species native of the western coast of North America. This name for the synantherous genus appears first in Hooker & Arnott, Bot. Beechey Voy. 148. 1833, in an incidental note following *Tridax ? galardioides* Hook. & Arn. thus: "If this were to form a new genus, we would propose the name *Layia,* after one of the discoverers." Five years later it was formally published by de Candolle, Prodr. 7: 294. 1838, as *Layia gaillardioides* DC. No further discussion of this case is needed, for the International Botanical Congress has formally placed the synantherous "*Laya* (minus rite *Layia*)" Hook. & Arn. in the list of *nomina generica conservanda.*

Chaenolobium Miquel, Fl. Ind. Bat. Suppl. 302. 1861, with two species from Sumatra, both based on incomplete material, was correctly reduced to *Ormosia* by Kurz. This reduction was accepted by Prain, Jour. As. Soc. Beng. 66(2): 468. 1897.

Macrotropis sensu Miquel, Fl. Ind. Bat. Suppl. 302. 1861, non DC., as noted above, is a synonym of *Ormosia* Jacks., but *Macrotropis* DC., at least for the most part, is a synonym of *Sophora* Linn.

Arillaria Kurz, Jour. As. Soc. Beng. **42**(2): 70. 1873, was based wholly on *Ormosia robusta* (Roxb.) Wight. Kurz emphasized the facts that the black seeds are arillate and that the pods are somewhat fleshy. Taubert, in Engl. & Prantl, Nat. Pflanzenfam. **3**(3): 194. 1891, retained the genus as distinct from *Ormosia*. Prain in 1900 placed it as a subgenus of *Ormosia*. It is now evident that Kurz misinterpreted the fleshy seed coats as representing an aril, and unless *Ormosia* be subdivided into a number of small genera, which does not impress us as desirable, *Arillaria* Kurz should remain as a synonym of *Ormosia*. The case is further discussed in the text, infra, p. 85.

Podopetalum F. v. Muell.[1] Melbourne Chem. Drugg. **5**: 12. 1882, Bot. Centralbl. **12**: 125. 1882, Vict. Nat. **1**: 5. 1885; Taubert in Engl. & Prantl, Nat. Pflanzenfam. **3**(3): 193. 1892; F. M. Bail. Queensl. Fl. **2**: 447. 1900; non Gaudin (1828).

Hormosia Reichenbach, Repert. Herb. Nomencl. 154. 1841, is an orthographic variant of *Ormosia*.

The references to the Chinese species are widely scattered in botanical literature. In 1887 Hemsley, Jour. Linn. Soc. Bot. **23**: 204. 1887, enumerated the three known species. In 1930 Prof. W. Y. Chun, Sci. Jour. Col. Sci. Sun Yatsen Univ. **2**: 43–48. 1930, published his "Record of the Genus *Ormosia* in Kwangtung" (in Chinese), and admitted eight species for that Province. In 1940 *Ormosia glaberrima* Wu was described from Kwangtung and Kwangsi material which we reduce to *O. emarginata* Benth. In 1920 Gagnepain, in Lecomte Fl. Gén. Indo-Chine **2**: 507–514. 1920, treated the eight known Indo-Chinese species, but, since for four of his new species he had only flowering specimens, it is difficult to place these in any scheme of classification based largely on fruit and seed characters. Unfortunately he did not indicate for any of these those vegetative characters used by Prain to differentiate the sections *Chaenolobium* and *Ormosia* proper (rachis not produced in *Chaenolobium* or produced above the insertion of the upper pair of leaflets in *Ormosia* proper), and one can, without the opportunity of consulting the type specimens, only assume that they belong in the larger group in which the leaf rachis is normally produced.

[1] **Ormosia Ormondi** (F. v. Muell.) Merrill, comb. nov.

Podopetalum Ormondi F. v. Muell. Syst. Census Austral. Pl. 42. 1882, Vict. Nat. **1**: 5. 1884; F. M. Bail. Syn. Queensl. Fl. 122. 1883, Queensl. Fl. **2**: 447. 1900.

The genus *Podopetalum* F. v. Muell. (non Gaudin, 1828) was described in 1882 on the basis of a flowering specimen, the author indicating its probable relationships with *Ormosia* and allied genera. In 1885 Mueller described the fruits and these were again described by F. M. Bailey in 1900, but neither author realized that he was dealing with an *Ormosia* as this genus was, and is, currently interpreted. Koehne, in repeating Mueller's generic diagnosis, Bot. Centralbl. **12**: 125. 1882, also includes his comments on the generic alliances; Mueller himself, in 1885, noted that the specific name did not appear until later in 1882 and then in his "Census." With excellent fruiting material from Queensland, the type region, I find no reason for considering that *Podopetalum* F. v. Muell. (non Gaudin, 1828) is other than *Ormosia* as the latter genus is generally interpreted and accordingly reduce it to the synonymy of the latter genus and transfer its type species to *Ormosia*. Taubert, in Engl. & Prantl, Nat. Pflanzenfam. **3**(3): 193. 1892, in accepting *Podopetalum* F. v. Muell. as a valid genus, makes the curious error of crediting it to New Zealand; as far as our records go it is known only from Queensland. This extends the generic range of *Ormosia* in the Old World to Queensland, Australia, where the species occurs along river banks, removes *Podopetalum* F. v. Muell. from the list of Australian genera and adds *Ormosia* in its place. Mueller's species is allied to *Ormosia calavensis* Azaola. E. D. M.

For neighboring regions in Asia, Baker, in Hook. f. Fl. Brit. Ind. 2: 252–254. 1878, considered seven species from British India, including those of British Burma and the Malay Peninsula (three in British India, one in Burma and four in the Malay Peninsula). There are now six species known from Burma, and the number of Malay Peninsula species was increased to eight by Prain, Jour. As. Soc. Bengal 66(2): 146–152. 1897 (Mater. Fl. Malay. Penin. 3: 146–152); to these Ridley added a ninth, Fl. Malay Penin. 1: 612–615. 1922. Only two species are recorded from Thailand (Siam), Craib, Fl. Siam. Enum. 1: 497. 1928, one of which extends to Yunnan. A single species occurs in Formosa. In the Malay Archipelago, including the Philippines, the genus is not strongly represented. Including the actually described species and certain apparently as yet undescribed ones, at least six occur in Sumatra, two in Java, three in Borneo, seven in the Philippines (of which *Ormosia calavensis* Azaola extends to the Moluccas, New Guinea, and the Palao Islands), and two in Celebes. It is highly probable that the number of Malaysian species will be increased as exploration progresses, for here, as is apparently the case in other parts of its generic range in the Old World, many of the species appear to be rare and local. A single species occurs in Australia. The few native African species formerly considered to belong in *Ormosia* are now placed in *Afrormosia* Harms and *Haplormosia* Harms.

Continental Asia (including the Malay Peninsula) seems clearly to be the center of distribution of the genus in the Old World, with no less than forty-seven species now known from various parts of the continent, and China has more known species (twenty-seven) than any other political area within the generic limits of the group in both hemispheres.

For convenience we have compiled the following list of Old World species, giving the known synonymy of each, except for those considered in detail in the body of this paper, and the geographic range of each species as far as this is known.

A List of the Old World Species of Ormosia[1]

1. **Ormosia apiculata** Chen, infra p. 111.
   China (Kwangsi).

[1] Several species have been described from Africa, but all of the native ones actually belong in the genera *Afrormosia* Harms and *Haplormosia* Harms. One species was described from specimens taken from an introduced and cultivated tree in the experimental garden at Victoria, Cameroons, and should be eliminated from the African list. This is *Ormosia Zahnii* Harms, Repert. Sp. Nov. **19:** 290. 1924, based on *Zahn 336, 688,* and regarding it Harms states: "Die Art stammt vielleicht aus dem tropischen Amerika, und es könnte sein, das sie von P. Preuss eingeführt worden est. Ich konnte sie zu keiner der mir bekannten Arten bringen und habe sie dahir als Neuheit beschrieben." The remaining African species are as follows:

Ormosia angolensis Baker in Oliver, Fl. Trop. Afr. **2:** 255. 1871 = **Afrormosia angolensis** (Baker) Harms in Engl. & Prantl, Nat. Pflanzenfam. Nachtr. **3:** 158. 1906. Lower Guinea.

Ormosia Brasseuriana de Wild. Ann. Mus. Congo Bot. **1:** 183. 1903 (Étud. Fl. Katanga) = **Afrormosia Brasseuriana** (de Wild.) Harms in Engl. Pflanzenw. Afr. **3**(1)**:** 527. 1915, *in obs.* Belgian Congo.

Ormosia laxiflora Benth. ex Baker in Oliver, Fl. Trop. Afr. **2:** 255. 1871 = **Afrormosia laxiflora** (Benth.) Harms in Engl. & Prantl, Nat. Pflanzenfam. Nachtr. **3:** 158. 1906. Upper Guinea.

Ormosia monophylla Harms ex Stapf in Johnston, Liberia **2:** 598. 1906 = *Crudia arborea* Harms, Bot. Jahrb. **30:** 80. 1901 = **Haplormosia monophylla** Harms, in Engl. Pflanzenw. Afr. **3**(1)**:** 533. 1915. Liberia.

2. **Ormosia Balansae** Drake, Jour. de Bot. **5**: 215. 1891; infra p. 114 (*O. elliptilimba* Merr. & Chun).
   Indo-China (Tonkin), China (Hainan, Kwangsi).
3. **Ormosia bancana** (Miq.) Prain, Jour. As. Soc. Bengal **69**(2): 184. 1900 (Bot. Notes Pap. 394. 1901), *in nota*.
   Macrotropis ? bancana Miq. Fl. Ind. Bat. Suppl. 295. 1861.
   Ormosia parvifolia Baker in Hook. f. Fl. Brit. Ind. **2**: 253. 1878; Prain ex King, Jour. As. Soc. Bengal **66**(2): 149 (Mater. Fl. Malay. Penin. **3**: 149), 469. 1897, **69**(2): 184. 1900 (Bot. Notes Pap. 394. 1901); Ridl. Fl. Malay Penin. **1**: 614. 1922.
   Malay Peninsula, Sumatra, Banca, Borneo.
4. **Ormosia basilanensis** Merr. Philip. Jour. Sci. **14**: 407. 1919, Enum. Philip. Fl. Pl. **2**: 269. 1923.
   Philippines (Basilan).
5. **Ormosia calavensis** Azaola in Blanco, Fl. Filip. ed. 2, 230. 1845; Prain, Jour. As. Soc. Bengal **69**(2): 180. 1900 (Bot. Notes Pap. 390. 1901); Merr. Philip. Jour. Sci. **1**: Suppl. 64. 1906, Philip. Jour. Sci. Bot. **5**: 58. 1910, Interpret. Rumph. Herb. Amb. 262. 1817, Enum. Philip. Fl. Pl. **2**: 269. 1923; Kaneh. Bot. Mag. Tokyo **45**: 285. 1931, Fl. Micronesica 144. *f. 49*. 1933.
   Pongamia ? corollaria Miq. Fl. Ind. Bat. **1**(1): 149. 1855.
   Corollaria latifolia Rumph. Herb. Amb. **3**: 175. *t. 110*. 1743.
   Philippines (Luzon to Mindanao), Moluccas, New Guinea, Palao Islands.
6. **Ormosia cambodiana** Gagnep. Not. Syst. **3**: 29. 1914, infra p. 102.
   Indo-China (Cambodia).
7. **Ormosia cathayensis** Chen, infra p. 112.
   China (Kwangtung).
8. **Ormosia Clementis** Merr. Philip. Jour. Sci. **14**: 406. 1919, Enum. Philip. Fl. Pl. **2**: 270. 1923.
   Philippines (Mindanao).
9. **Ormosia crassivalvis** Gagnep. Not. Syst. **3**: 29. 1914, infra p. 101.
   Indo-China (Cochinchina).
10. **Ormosia decemjuga** (Miq.) Prain, Jour. As. Soc. Bengal **66**(2): 468. 1897, **69**(2): 184. 1900 (Bot. Notes Pap. 394. 1901).
    Chaenolobium decemjugum Miq. Fl. Ind. Bat. Suppl. 302. 1861.
    Sumatra.
11. **Ormosia emarginata** (Hook. & Arn.) Benth. Hook. Jour. Bot. Kew Gard. Miscel. **4**: 77. 1852 (*Layia emarginata* Hook. & Arn.), infra p. 107.
    Ormosia glaberrima Wu, Bot. Jahrb. **71**: 182. 1940.
    Indo-China (Tonkin), China (Hongkong, Kwangtung, Kwangsi, Hainan).
12. **Ormosia euphorioides** Pierre, ex Gagnep. Not. Syst. **3**: 30. 1914, infra p. 114.
    Indo-China (Cochinchina).
13. **Ormosia Fordiana** Oliv. in Hook. Ic. **25**: *t. 2422*. 1896; infra p. 101.
    Indo-China (Tonkin), China (Kwangtung, Hainan, Kwangsi, Yunnan).
14. **Ormosia formosana** Kaneh. Bot. Mag. Tokyo **30**: 420. 1916, infra p. 109.
    Formosa.
15. **Ormosia glauca** Wall. Pl. As. Rar. **2**: 23. *t. 125*. 1831; Baker in Hook. f. Fl. Brit. Ind. **2**: 253. 1878; Prain, Jour. As. Soc. Bengal **66**(2): 467. 1897, **69**(2): 180. 1900 (Bot. Notes Pap. 390. 1901).
    India.
16. **Ormosia gracilis** Prain ex King, Jour. As. Soc. Bengal **66**(2): 148 (Mater. Fl. Malay. Penin. **3**: 148), 468. 1897, **69**(2): 180. 1900 (Bot. Notes Pap. 390. 1901); Ridl. Fl. Malay Penin. **1**: 613. 1922.
    Malay Peninsula.
17. **Ormosia grandifolia** Merr. Philip. Jour. Sci. **14**: 408. 1919, Enum. Philip. Fl. Pl. **2**: 270. 1923.
    Philippines (Luzon).
18. **Ormosia Henryi** Prain, Jour. As. Soc. Bengal **69**(2): 180. 1900 (Bot. Notes Pap. 390. 1901), infra p. 109 (*O. Henryi* Hemsl. & Wils., *O. mollis* Dunn & Tutch.).
    Indo-China (Tonkin), China (Chekiang, Fukien, Anhwei, Kwangsi, Hupeh, Kiangsi, Hunan, Kweichow, Kwangtung).
19. **Ormosia hoaensis** Pierre ex Gagnep. Not. Syst. **3**: 32. 1914; infra p. 114.
    Indo-China (Cochinchina).

20. **Ormosia Hosiei** Hemsl. & Wils. Kew Bull. **1906:** 156. 1906 (*O. Taiana* Chiao), infra p. 113.
China (Hupeh, Szechuan, Shensi, Kiangsu).
21. **Ormosia Howii** Merr. & Chun, infra p. 112.
China (Hainan).
22. **Ormosia incerta** Koord. in Koord. & Val. Atlas Baumart. Java **4:** *t. 798.* 1918.
Java.
23. **Ormosia indurata** Chen, infra p. 104.
China (Kwangtung, Kwangsi).
24. **Ormosia inflata** Merr. & Chun, infra p. 100.
China (Hainan).
25. **Ormosia inopinata** Prain, Jour. As. Soc. Bengal **69**(2)**:** 180. 1900 (Bot. Notes Pap. 390. 1901) (var. **typica** Prain, l.c.).
Burma (Kachin Hills).
Var. **dubia** Prain, l.c. (*Ormosia dubia* Prain, op. cit. 182, *in nota*).
Burma (Kachin Hills).
26. **Ormosia kwangsiensis** Chen, infra p. 108.
China (Kwangsi).
27. **Ormosia laxa** Prain, Jour. As. Soc. Bengal **69**(2)**:** 182. 1900 (Bot. Notes Pap. 392. 1901).
Burma (Kachin Hills).
28. **Ormosia longipes** Chen, infra p. 100.
China (Yunnan).
29. **Ormosia macrodisca** Baker in Hook. f. Fl. Brit. Ind. **2:** 253. 1878; Prain ex King, Jour. As. Soc. Bengal **66**(2)**:** 148 (Mater. Fl. Malay. Penin. **3:** 148), 467. 1897, **69**(2)**:** 179. 1900 (Bot. Notes Pap. 389. 1901); Ridl. Fl. Malay Penin. **1:** 613. 1922.
Malay Peninsula, Sumatra.
30. **Ormosia Merrilliana** Chen, infra p. 99.
Indo-China (Tonkin), China (Kwangtung, Kwangsi).
31. **Ormosia microphylla** Merr., infra p. 109.
China (Kwangsi).
32. **Ormosia microsperma** Baker in Hook. f. Fl. Brit. Ind. **2:** 253. 1878; Prain ex King, Jour. As. Soc. Bengal **66**(2)**:** 151 (Mater. Fl. Malay. Penin. **3:** 151), 468. 1897, **69**(2)**:** 183. 1900 (Bot. Notes Pap. 393. 1901); Ridl. Fl. Malay Penin. **1:** 614. 1922.
Ormosia coarctata sensu Kurz, Jour. As. Soc. Bengal **42**(2)**:** 71. 1873, non Jacks.
Malay Peninsula.
Var. **Ridleyi** Prain, Jour. As. Soc. Bengal **66**(2)**:** 151 (Mater. Fl. Malay. Penin. **3:** 151), 468. 1897, **69**(2)**:** 183. 1900 (Bot. Notes Pap. 393. 1901); Ridl. Fl. Malay Penin. **1:** 615. 1922 (*Ormosia Ridleyi* Prain, l.c., *in nota*).
Singapore.
33. **Ormosia monochyana** Boerl. & Koord. ex Koord. Meded.'s Lands Plantent. **19:** 441. 1898.
Celebes.
34. **Ormosia nanningensis** Chen, infra p. 113.
China (Kwangsi).
35. **Ormosia olivacea** Chen, infra p. 110.
China (Yunnan).
36. **Ormosia orbiculata** Merr. Philip. Jour. Sci. **14:** 405. 1919, Enum. Philip. Fl. Pl. **2:** 270. 1923.
Philippines (Luzon).
37. **Ormosia Ormondi** (F. Muell.) Merr. supra, p. 79.
Podopetalum Ormondi F. Muell. Syst. Census Austral. Pl. 42. 1882, Vict. Nat. **1:** 5. 1884; F. M. Bail. Queensl. Fl. **2:** 447. 1900.
Australia (Queensland).
38. **Ormosia pachycarpa** Champ. ex Benth. Hook. Jour. Bot. Kew Gard. Miscel. **4:** 76. 1852; infra p. 98.
China (Hongkong).
39. **Ormosia pachyptera** Chen, infra p. 104.
China (Kwangsi).

40. **Ormosia palembanica** S. Moore, Jour. Bot. **64**: Suppl. 145. 1926.
Sumatra.
41. **Ormosia paniculata** Merr. Govt. Lab. [Philip. Publ.] **35**: 21. 1905, Philip. Jour. Sci. **1**: Suppl. 64. 1906, Philip. Jour. Sci. Bot. **5**: 58. 1910, Enum. Philip. Fl. Pl. **2**: 270. 1923.
Philippines (Luzon).
42. **Ormosia penangensis** Ridl. Jour. As. Soc. Straits Branch **68**: 11. 1915, Fl. Malay Penin. **1**: 613. 1922.
Malay Peninsula (Penang).
43. **Ormosia pinnata** (Lour.) Merr. Lingnan Sci. Jour. **14**: 12. 1935, infra p. 103 (*Cynometra pinnata* Lour., *Ormosia hainanensis* Gagnep.).
Indo-China (Annam), China (Kwangtung, Hainan).
44. **Ormosia polita** Prain, Jour. As. Soc. Bengal **69**(2): 184. 1900 (Bot. Notes Pap. 394. 1901).
Ormosia nitida Prain ex King, op. cit. **66**(2): 149 (Mater. Fl. Malay. Penin. **3**: 149), 468. 1897; Ridl. Fl. Malay Penin. **1**: 613. 1922; non Vogel.
Malay Peninsula.
45. **Ormosia polysperma** Chen, infra p. 106.
China (Kwangtung, Kwangsi, Kiangsi).
46. **Ormosia purpureiflora** Chen, infra p. 105.
China (Kwangtung).
47. **Ormosia robusta** (Roxb.) Wight ex Baker in Hook. f. Fl. Brit. Ind. **2**: 252. 1878; Prain, Jour. As. Soc. Bengal **69**(2): 179. 1900 (Bot. Notes Pap. 389. 1901), **73**(2): 45. 1904; Craib, Fl. Siam. Enum. **1**: 497. 1928; Kanjilal, Kanjilal & Das, Fl. Assam **2**: 118. 1938.
Sophora robusta Roxb. Hort. Beng. 31. 1814, *nomen nudum;* Wight, Ic. **1**: [25]. *t. 245.* 1840.
Ormosia floribunda Wall. List no. 5337. 1832, *nomen nudum.*
Arillaria robusta Kurz, Jour. As. Soc. Bengal **42**(2): 71. 1873, For. Fl. Brit. Burma **1**: 334. 1877; Taub. in Engl. Nat. Pflanzenfam. **3**(3): 194. 1892.
India, Burma, Siam.
48. **Ormosia scandens** Prain ex King, Jour. As. Soc. Bengal **66**(2): 147 (Mater. Fl. Malay. Penin. **3**: 147), 467. 1897, **69**(2): 182. 1900 (Bot. Notes Pap. 392. 1901); Ridl. Fl. Malay Penin. **1**: 612. 1922.
Malay Peninsula.
49. **Ormosia semicastrata** Hance, Jour. Bot. **20**: 78. 1882, infra p. 111.
China (Kwangtung, Hainan, Kwangsi).
50. **Ormosia septemjuga** (Miq.) Prain, Jour. As. Soc. Bengal **66**(2): 468. 1897, **69**(2): 184. 1900 (Bot. Notes Pap. 394. 1901).
Chaenolobium septemjugum Miq. Fl. Ind. Bat. Suppl. 302. 1861.
Sumatra.

A species of somewhat doubtful status, based on sterile material, allied to *Ormosia microsperma* Baker, to which Kurz reduced Miquel's species; Prain thinks that it is not the same as Baker's species.

51. **Ormosia sericeolucida** Chen, infra p. 107.
China (Kwangsi).
52. **Ormosia simplicifolia** Merrill & Chun, infra p. 102.
Ormosia obscurinervia Merr. & Chun ex Tanaka & Odashima, Jour. Soc. Trop. Agr. **10**: 369. 1938, *nomen nudum.*
Indo-China (Tonkin), China (Hainan).
53. **Ormosia striata** Dunn, Jour. Linn. Soc. Bot. **35**: 492. 1903, infra p. 103.
China (Yunnan), Burma.
54. **Ormosia sumatrana** (Miq.) Prain ex King, Jour. As. Soc. Bengal **66**(2): 150 (Mater. Fl. Malay. Penin. **3**: 150), 469. 1897, **69**(2): 183. 1900 (Bot. Notes Pap. 393. 1901); Ridl. Fl. Malay Penin. **1**: 614. 1922; Koord. Exkursionsfl. Java **2**: 372. 1912, **4**(Atlas): *f. 1215.* 1926.
Macrotropis sumatrana Miq. Fl. Ind. Bat. Suppl. 294. 1861.
Malay Peninsula, Sumatra, Java.

55. **Ormosia surigaensis** Merr. Philip. Jour. Sci. **17**: 263. 1920, Enum. Philip. Fl. Pl. **2**: 270. 1923.
Philippines (Mindanao).
56. **Ormosia tavoyana** Prain, Jour. As. Soc. Bengal **73**(2): 46. 1904.
Burma.
57. **Ormosia tonkinensis** Gagnep. Not. Syst. **3**: 200. 1914, infra p. 115.
Indo-China (Tonkin).
58. **Ormosia travancorica** Bedd. Fl. Sylv. S. Ind. *t. 45*. 1869; Baker in Hook. f. Fl. Brit. Ind. **2**: 253. 1879; Prain, Jour. As. Soc. Bengal **69**(2): 180. 1900 (Bot. Notes Pap. 390. 1901).
India.
59. **Ormosia Tsangii** Chen, infra p. 115.
Indo-China (Tonkin).
60. **Ormosia venosa** Baker in Hook. f. Fl. Brit. Ind. **2**: 254. 1878; Prain ex King, Jour. As. Soc. Bengal **66**(2): 152 (Mater. Fl. Malay. Penin. **3**: 152). 1897, **69**(2): 185. 1900 (Bot. Notes Pap. 395. 1901); Ridl. Fl. Malay Penin. **1**: 615. 1922.
Malay Peninsula.
61. **Ormosia Villamilii** Merr. Philip. Jour. Sci. Bot. **10**: 313. 1915, Enum. Philip. Fl. Pl. **2**: 270. 1923.
Philippines (Mindanao).
62. **Ormosia Watsonii** C. E. C. Fischer, Kew Bull. **1927**: 88. 1927.
Burma.
63. **Ormosia xylocarpa** Chun, infra p. 105.
China (Hainan, Kwangsi).
64. **Ormosia yunnanensis** Prain, Jour. As. Soc. Bengal **69**(2): 183. 1900 (Bot. Notes Pap. 393. 1901), infra p. 110.
China (Yunnan), Siam.

The genus as a whole has been variously divided. Bentham, in Martius Fl. Brasil. **15**(1): 315–319. 1862, placed the nine then known Brazilian species in two groups, *Concolores,* with leaflets glabrous or nearly so on both surfaces, and *Discolores,* with leaflets paler beneath and puberulous, silky, or tomentose. While he named and characterized the groups, he did not assign any definite category to them such as subgenus, section, or subsection. Baker, in Hook. f. Fl. Brit. Ind. **2**: 252–254. 1878, adopted the same arrangement for the Indian species, but assigned no names to the subdivisions. Taubert, in Engl. & Prantl, Nat. Pflanzenfam. **3**(3): 194. 1892, formally accepted Bentham's groups as sections applicable to the whole genus. Prain, Jour. As. Soc. Bengal **69**(2): 175–186. 1900 (Bot. Notes Pap. 385–396. 1901), did not accept Taubert's sectional names, as he thought that this did not always permit species that are manifestly closely related to remain together. He considered that a classification based on characters derived from the fruits and seeds was preferable to one based on the color and degree of tomentum of the leaves, and we can but agree with him in this matter.

Prain arranged the Old World species in two subgenera, *Arillaria* (Kurz) Prain, and *Toulichiba* (Adanson) Prain, the former containing a single species, *Ormosia robusta* (Roxb.) Wight, which is described as having somewhat fleshy pods, the large black seeds enclosed in a fleshy red aril. *Toulichiba* was characterized by having woody or at least very coriaceous pods and non-arillate seeds, and under this Prain arranged the Old World species, as far as possible on the basis of the material available to him, under the sections *Chaenolobium* (Miq.) Prain, and *Ormosia* proper, the latter with three subsections, *Macrodisca* Prain, *Layia* (Hook. & Arn.) Prain, and *Amacrotropis* Miq., these subdivisions being based on the characters of the fruits and the seeds. Four years later, Jour. As. Soc. Bengal **73**(2): 46. 1904, Prain proposed a fourth subsection, *Striatae,*

to take *Ormosia striata* Dunn. We have seen no eastern Asiatic species that we consider to be referable to the subsection *Macrodisca* Prain.

While Prain's scheme of classification has its favorable aspects, there is some question regarding his divisions. He proposed two subgenera, *Arillaria* (Kurz) Prain (*Arillaria* Kurz as a genus) with "pod with fleshy valves; seeds black, enveloped in a fleshy arillus," and *Toulichiba* (Adanson) Prain (*Toulichiba* Adanson as a genus) with "pod with woody valves; seeds scarlet, with or without a black spot near the hilum, not enveloped in an aril." The former was based on an Asiatic species, *Ormosia robusta* (Roxb.) Wight. Unfortunately the material available to us representing Wight's species has very immature pods and seeds, but from an examination of this we conclude that *Arillaria* was proposed, and has been maintained, on the basis of a misinterpretation of the seed characters. In proposing the genus *Arillaria,* Kurz described the seeds of *A. robusta* (Roxb.) Kurz thus: "Semina 2 v. abortu ut plurimum solitarium, magna, oblonga, nigra, arillo carnoso miniato complete involutum" and as "semen magnum, oblongum, aterrimum, lucidum, arillo miniato dein sanguineo carnoso complete involutum." Baker added the size of the seeds as one and one-half inches in length, quoting from Kurz, "enveloped in a complete thick scarlet aril." Kurz's interpretation was accepted by Taubert and by Prain. Our *Shaik Mokim* specimen from Tavoy, determined by Prain as representing *Ormosia robusta* (Roxb.) Wight, has immature pods and seeds, as noted above, but a careful examination of these shows that the cotyledons are free within a somewhat thickened aril-like integument, which on soaking becomes distinctly fleshy, and which we interpret not as an aril, but as the free and fleshy seed coats.[1] We call attention to the fact that in the seeds of the otherwise totally different *Ormosia Fordiana* Oliv. a similar development occurs, in that when the seeds are mature they are, when dry, surrounded by uniformly red, free or nearly free, crustaceous and fragile seed coats, and that these, when fresh, are more or less fleshy and actually stain the adjacent inner walls of the valves more or less red; these seed coats of *Ormosia Fordiana* Oliv. simulate the aril. However, in a further discussion of the so-called "aril" of certain species of *Ormosia,* it should be noted that for *Ormosia gracilis* Prain the seeds are described as "usually solitary, oblong, .75 in. long, with a black adnate smooth aril." Of this we have seen but a single specimen, *Md. Nur 11747,* from Negri Sembilan, determined at Singapore as representing *Ormosia gracilis* Prain, and in this the mature seed is suborbicular in outline, about 2 cm. in diameter, hard, somewhat rugose, shining and brownish red in color, with no sign of an aril. Of course this specimen may be wrongly identified, but as far as one can tell from the published descriptions it agrees very closely except that there is no aril. Re-

[1] Mr. Sealy of the Royal Botanic Gardens, Kew, examined the material in the Kew Herbarium, and reports under date of February 10, 1942, as follows: "Our only specimen of *Ormosia robusta* (Roxb.) Wight (*Arillaria robusta* Kurz) with fruits is *Kurz 1737,* and unfortunately there are no good seeds. One fruit still has a seed but the inside of this is quite eaten away, and the crustaceous coat is crushed. The seed coat is rusty coloured and a section of a small piece of it showed a thin reddish epidermal layer over a thick one, which in some sections was more or less homogeneous and brownish, but which in other sections appeared as two zones of contrasting colour, the upper reddish to very dark brown, the lower brownish. I should say that the reddish 'skin' represented an integument and not an aril." In June, 1942, Dr. Hochreutiner of Geneva sent us a mature seed of *Shaik Mokim 716* from Burma and states that there is no aril. An examination of this seed confirms his statement, in that the integuments, apparently somewhat fleshy when fresh, are thickened when dry, free from the cotyledons, red, and distinctly rugose.

garding the material representing *O. gracilis* Prain in the Kew Herbarium, Mr. Sealy states: "The black basal part of the outer seed coat is scarcely thickened. I did not care to dissect the only seed on *Wray 2979,* but I have boiled up and cut a seed from *Ridley 2103,* which is exactly similar. The black and red parts form one continuous coat beyond a shadow of doubt." The species is thus non-arillate.

Baker described the seeds of *Ormosia macrodisca* Baker as having "a large black pitted aril" and Prain used this character in his key for separating this species and *Ormosia gracilis* Prain from other species of the genus. Unfortunately our single specimen of *Ormosia macrodisca* Bak., *Maingay 600,* is incomplete; the valves are present but the seeds are lacking. Mr. Sealy kindly examined the Kew specimen of *Maingay 600* and reports that the black basal parts of the seed coats are slightly thickened, and that in section the seed coat and so-called "aril" appear as one continuous coat, very similar to the condition noted in the seeds of *Ormosia gracilis* Prain. It is thus clear that the so-called "aril" must be eliminated from the description of both *O. macrodisca* Baker and *O. gracilis* Prain.

Ormosia Taiana Chiao = *O. Hosiei* Hemsl. & Wils. was erroneously described as having red-arillate seeds; examination of an isotype shows that the hard smooth red testa was inadvertently described as an aril.

As to the subgeneric name *Toulichiba* (Adanson) Prain (*Toulichiba* Adanson as a genus), this was originally based wholly on "Pseudo-Acacia Plum. M. S. Vol. *7. t. 145,*" and Jackson actually examined Plumier's unpublished plate. The same Plumier plate was cited by Aublet, Hist. Pl. Guiane **2**: 773. 1775, as representing *Robinia coccinea* Aubl. It is the West Indian *Ormosia monosperma* (Sw.) Urban, Symb. Antil. **1**: 321. 1899, *in obs.,* Rep. Sp. Nov. Beih. **5**: 147. 1920, of which *O. dasycarpa* Jacks. is a synonym. Thus, as *Toulichiba* nomenclaturally is an exact synonym of Ducke's § *Bicolores, Vulgares,* it should not, we feel convinced, be used for an Asiatic-Malaysian assemblage that does not conform entirely with the characters of the original American group. As a major or minor group, *Toulichiba* nomenclaturally is not only exactly *Ormosia* as originally defined by Jackson, but it is also identical with Prain's subdivision *Ormosia* proper.

Ducke, Arch. Jard. Bot. Rio Janeiro **3**: 135–139. 1922, **4**: 61–71. 1925, arranged the Brazilian species in three sections, *Macrocarpae, Flavae,* and *Bicolores.* Amshoff, Meded. Bot. Mus. Herb. Rijks Univ. Utrecht **52**: 47. 1939, proposed a new section *Unicolores,* which Ducke, in the same year, Ann. Acad. Bras. Scienc. **21**: 179–193. *2. t.* 1939, in his last revision of the twenty Brazilian species, placed as a subsection of *Bicolores.* Ducke's final arrangement includes § *Macrocarpae* and § *Flavae,* each with one species and both in part characterized by having indehiscent pods; the Old World species, with the possible exception of *Ormosia Balansae* Drake, have dehiscent pods, for those of Drake's species appear to be indehiscent or very tardily dehiscent. *Ormosia Coutinhoi* Ducke of Brazil, the only species in the section *Macrocarpae,* and *O. Balansae* Drake of southern China and Tonkin have one very striking character in common, that being a very greatly elongated hilum; otherwise the two are not closely allied. Ducke's third section, *Bicolores,* characterized by having dehiscent pods, the seeds more or less compressed and red with a black spot, or wholly red, the ovaries pubescent, probably is closer to the Old World representatives of the genus than are the other two sections. This group he subdivided into three

subsections: *Subglobosae,* the seeds globose, large, 2.5 cm. in diameter, with transverse cotyledons, to take one species; *Unicolores,* with strongly compressed, uniformly red shining seeds, the cotyledons longitudinal, with four species; and *Vulgares,* with moderately compressed seeds varying in size up to a maximum of 15 mm. in length, with transverse cotyledons, the testa red and usually with a black spot, the presence or absence of this black spot not always uniform in certain species; to this last group belong many of the American species.

It is probable that the affiliations of the majority of the Old World species are to be sought in Ducke's section *Bicolores,* subsections *Unicolores* and *Vulgares,* the latter being both *Ormosia* Jacks. as originally described, and *Toulichiba* Adans. Amshoff stated that she did not know whether Prain's section *Ormosia* proper was quite identical with the section *Bicolores* Ducke, to which the type species of *Ormosia* belongs. We judge that the Old World species probably should not be placed in the same divisions and subdivisions that Ducke established for the Brazilian forms. Ducke did not discuss Prain's scheme of classification, probably because he did not have access to the latter's paper.

In most of the Old World species the seeds are uniformly red, the testa being hard, smooth, and shining; when the seeds are immature, the red color may approximate orange-red. We have seen no Old World species with yellow seeds. One Indo-Chinese species, *Ormosia crassivalvis* Gagnep., has seeds 3 cm. long, the testa hard, smooth, shining and uniformly black or black more or less mottled with brownish red, the margins always surrounded by a very distinct red band 2 to 5 mm. wide. A single Philippine species, *Ormosia Clementis* Merr., has red seeds with a black spot near the hilum as in many American species; the "black aril," which Baker credited to the seeds of *Ormosia macrodisca* Baker and which Prain credited to *Ormosia gracilis* Prain, proves to be a black part of the seed integuments and not an aril at all. As opposed to the numerous species with red hard seeds, there are a few centering around *Ormosia pachycarpa* Champ. that have black or almost black, uniformly castaneous or pale brown seed coats, these more or less crustaceous, sometimes fragile, and easily separable from the cotyledons. Another type is represented by *Ormosia Fordiana* Oliv., where, at maturity, the red seed coats are more or less fleshy when fresh, actually staining the inner walls of the pods opposite the seeds, but when dry become crustaceous, fragile, and free or nearly free from the cotyledons, simulating an aril. It is clear that the so-called aril in *Ormosia robusta* (Roxb.) Wight, which lead Kurz to propose the genus *Arillaria* for this form, is nonexistent, and what was mistaken for an aril is actually the thickened fleshy seed coats.

In the majority of the Old World species the seeds are more or less elongated and horizontal in the pod. They vary greatly in size from less than 1 cm. in length to as much as 3 cm., or in *Ormosia robusta* (Roxb.) Kurz to as much as 4 cm. long. In most species they are more or less compressed, although they are never very flat, but in some they are almost globose. In others they may be somewhat wider than long, approaching orbicular or very broadly orbicular-obovate in outline, but never reniform.

In a few Old World species, such as *Ormosia simplicifolia* Merr. & Chun and *O. xylocarpa* Chun, quite unrelated in other characters, the mature seeds, although with hard smooth red and shining integuments like the majority of the Asiatic-Malaysian species, may be distinctly viscid, at least when fully mature, but this character is apparently of little significance.

The hilum character has received little attention. An examination of all of our material shows that, as far as the seeds are known, the hilum is usually small, 1 to 3 or occasionally 3.5 mm. long. In two species, however, it is distinctly elongated. Thus in the seeds of *Ormosia Hosiei* Hemsl. & Wils. (*O. Taiana* Chiao) the conspicuous hilum is 7 mm. in length and in the otherwise quite unrelated *Ormosia Balansae* Drake the very conspicuous hilum extends nearly half way around the seed, attaining a length of 15 mm. In all other characters these two species conform to the majority of the species of *Ormosia* and there seems to be no valid reason for subdividing the genus on this character alone. One Brazilian species (*Ormosia Coutinhoi* Ducke), has a very long hilum, and Pierce, Trop. Woods **71**: 1–2. 1942, has removed it from *Ormosia,* establishing for it the new genus *Macroule* Pierce.

The pods present great variations in size, in shape, in the number of seeds, in indumentum, and in the characters of the valves, but in most of the Old World species they are ultimately dehiscent. The valves vary in texture from crustaceo-coriaceous to very woody, and from less than 1 mm. to several mm. in thickness. The pods may be small or large, glabrous or pubescent, strongly compressed or almost cylindric, and while in certain species they are always one-seeded, in others the number of seeds varies from one to as many as nine or ten, and pods with such variations not infrequently occur on the same specimen. In some species the pods are non-septate between the seeds, or with only vestiges of septae, while in others they are always septate. In certain species the valves are distinctly depressed between the seeds, becoming at least subtorulose, but in others they are smooth and without depressions. In at least one Chinese species the greatly thickened edges of the valves are produced as a wing-like margin extending 5 to 15 mm. beyond the seed-bearing parts of the pod. In certain species, notably *Ormosia simplicifolia* Merr. & Chun, *O. striata* Dunn, *O. pinnata* (Lour.) Merr., *O. indurata* Chen, *O. xylocarpa* Chun, *O. polysperma* Chen, *O. emarginata* (Hook. & Arn.) Benth., *O. Henryi* Prain, and *O. yunnanensis* Prain, the pods, even on a single specimen, vary greatly in the number of developed seeds, in shape, and in size, the number of seeds in a few species varying from one to as many as nine or ten, although the variation is mostly much less, from one to four or five; in these cases there is a corresponding variation in the size and shape of the pods.

Except in size, indumentum, color, and the outlines of petals, etc., the floral characters are in general distinctly uniform. The standard may or may not be provided with basal indurated areas, and the keel and wing petals may or may not be auriculate at their bases; all petals are, in general, glabrous. The ovaries may be sessile or distinctly stipitate, and glabrous, uniformly densely pubescent, or glabrous on the sides and pubescent on their margins; the ovules vary from two or three to as many as ten. In most species there are ten free stamens, but in one group, characterized by *Ormosia semicastrata* Hance, there are only five fertile stamens, but even here, a point that Hance did not mention, the flowers of his type collection have very slender staminodes or sterile filaments, these varying in number from two to four; in this group the pods are always small and strictly 1-seeded, but the small seeds are those of *Ormosia,* being hard, red, smooth, and shining.

In habit, with one exception, all of the Old World species are erect shrubs or trees. *Ormosia scandens* Prain, of the Malay Peninsula, is a large vine, but of this the fruits are as yet unknown. Some of the species are glabrous through-

out, while other are very pubescent, the type, color, and characters of the indumentum varying greatly.

In vegetative characters, all of the Old World species have pinnate leaves with the exception of *Ormosia simplicifolia* Merr. & Chun, in which all the leaves are strictly simple. The leaflets vary greatly in number, size, shape, texture, and indumentum, occasionally 3-foliolate leaves being noted; but not infrequently on the same specimen one notes considerable variation in the number of pairs of leaflets; normally the leaves are imparipinnate. The rachis character that Prain depended upon to characterize his section *Chaenolobium* proves to be inconstant. In a few species we have noted no prolongation of the rachis above the insertion of the upper pair of leaflets, but in other species, notably *Ormosia pachycarpa* Champ., placed by Prain in *Chaenolobium,* the rachis may be not at all produced or shortly but distinctly produced even on the same specimen. Among those species that Prain would place in *Ormosia* proper, characterized in part by the rachis being distinctly produced, we note five or six species where the rachis production, normally well developed, may be entirely absent, or produced and non-produced rachises occurring on the same specimen. In such a characteristic species as *Ormosia semicastrata* Hance, where in the Hongkong type the rachis is very greatly produced, most of the specimens from China proper that we place here have the rachises much less produced, often only slightly so. We conclude that this rachis character, being distinctly variable, is scarcely a sufficiently strong one to be used for other than the differentiation of species, and even here it must be used with caution.

In 1900, Prain, Jour. As. Soc. Bengal **69**(2): 175–186. 1900 (Bot. Notes Pap. 385–396. 1901), in his summary of the data then available regarding the Asiatic (and Malaysian) species of *Ormosia,* recognized twenty-two species. He states: "As regards the distribution the most striking features connected with *Ormosia* are (1) the widespread occurrence of the genus throughout Southeastern Asia, from Hupeh in China to Bangka in the Malayan Archipelago, and from Travancore and Nepal to the Philippines; (2) the remarkably limited range of individual species with the exception of *O. parvifolia* [= *O. bancana*] which extends from the Malay Peninsula to Bangka and Borneo, and to a less extent *O. sumatrana* which occurs on both sides of the Straits of Malacca. *O. robusta* also has a wider range than most of the species for it extends from the valley of Assam through Silhet and Chittagong to Pegu and Tenasserim. It is interesting, however, to note that very closely related species such as *O. pachycarpa* and *O. venosa,* and again *O. yunnanensis* [now also known from Siam] and *O. sumatrana,* may occur in widely separated localities." The picture is now considerably changed, as the limits of the genus have been extended farther north in China, and east to Formosa, and farther to the south and east, with representatives now known from Java, Celebes, the Moluccas, New Guinea, the Palao Islands, and Australia (Queensland).

The present study of the eastern Asiatic species of *Ormosia* confirms Prain's findings. It is a notable fact that of the thirty-four species now known from China, Formosa, and Indo-China, twenty are known only from single provinces. The geographic ranges of the other species within the area considered are all restricted to contiguous or relatively close geographic units (provinces), except *Ormosia Henryi* Prain, which is now known from Chekiang, Anhwei, Fukien, Kwangtung, Kwangsi, Kweichow, Kiangsi, Hupeh, Hunan, and Tonkin. The known distribution of the remaining species occurring in more than one geo-

graphic subdivision are: *Ormosia Balansae* Drake (Tonkin, Hainan, Kwangsi), *O. emarginata* Benth. (Kwangtung, Kwangsi, Hainan, Tonkin), *O. polysperma* Chen (Kwangtung, Kwangsi, Kiangsi), *O. Fordiana* Oliv. (Kwangtung, Hainan, Kwangsi, Yunnan, Tonkin), *O. Hosiei* Hemsl. & Wils. (Szechuan, Hupeh, Shensi, Kiangsu, but apparently introduced in Shensi and Kiangsu), *O. Merrilliana* Chen (Kwangtung, Kwangsi, Tonkin), *O. indurata* Chen (Kwangtung, Kwangsi), *O. pinnata* (Lour.) Merr. (Kwangtung, Hainan, Annam), *O. semicastrata* Hance (Kwangtung, Kwangsi, Hainan), *O. simplicifolia* Merr. & Chun (Hainan, Tonkin), *O. striata* Dunn (Yunnan, Burma), *O. yunnanensis* Prain (Yunnan, Siam), and *O. xylocarpa* Chun (Hainan, Kwangsi). The most widely distributed species in the Old World is *Ormosia calavensis* Azaola, which extends from northern Luzon to Mindanao in the Philippines, southward and eastward to the Moluccas, New Guinea (Fly River region, *Brass 7514*), and the Palao Islands. The most southern species is *Ormosia Ormondi* (F. Muell.) Merr. of Australia (Queensland).

One is constantly impressed by the local occurrence of most of the species and by the few individual collections representing them, and can only conclude that the majority of the species are not only local, but that many of them are rare. It is noteworthy in this genus, as was the case with the Old World species of *Microtropis,*[1] that not a single species of *Ormosia* even approximates the geographic limits of the genus in range, extending as it does from Assam to Travancore in India (unknown in Ceylon), Burma, Thailand (Siam), Indo-China, central and southern China and Formosa, southward and eastward through the Philippines and the Malay Peninsula to Sumatra, Java, Celebes, the Moluccas, New Guinea, the Palao Islands, and Australia (Queensland).

On the whole we are satisfied that *Ormosia* Jackson, as at present constituted, forms a distinctly natural assemblage and a group where, with reasonably complete material, one can be certain that one is dealing with a representative of this genus. Although it may ultimately be possible to propose and maintain formal subgenera or sections to take certain groups of species, it is felt that such a study should be based on all available material from all parts of the generic range, to include not only the species of the Old World, but also those of America. We have therefore been content, in this study, to propose a group of series, under which we have attempted to assemble certain species that have more or less definite characters in common. We do not think that Ducke's arrangement is applicable to the Old World species, and we are not convinced that Prain's arrangement of the Old World species in certain subgenera, sections and subsections is practicable; attention is called to the fact that Prain emphasized the fact that his arrangement was purely a tentative one. Like ourselves, he was handicapped by having access to inadequate material, for in a group like *Ormosia* one needs not only a large number of individual collections of each species showing ranges of variation in vegetative and other characters, but one also needs a series of specimens in full flower, supplemented by ample material with mature fruits. Unfortunately many Old World species are still known only from flowering specimens, and many more are known from fruiting specimens alone. Until more comprehensive collections are available we do not think that the time has arrived to consider possible subgenera. Like Prain and

[1] **Merrill, E. D. & Freeman, F. L.** The Old World species of the Celastraceous genus Microtropis. Proc. Am. Acad. Arts Sci. **73**: 271–310. 1940 (Mem. Gray Herb. **5**: 271–310).

like Ducke, we have based our arrangement of the species, under the serial names proposed in this paper, largely on the characters of the fruits and the seeds, supplemented by certain vegetative characters.

The objective in this attempt to revise the eastern Asiatic species of *Ormosia* is to enumerate all of the known Chinese and Formosan species, as well as those of Indo-China, to give the more important literature references, to adjust the synonymy, to cite all specimens available to us for study purposes, and to indicate the known range for each species. For the convenience of those who may have occasion to study the genus later an artificial key to the thirty-four recognized species has been prepared. The net result has been to increase the known Chinese species of *Ormosia* from ten to twenty-seven, the additions all being in the form of previously undescribed species.

This paper is based essentially on the material available in the herbarium of the Arnold Arboretum, supplemented by the specimens in the Gray Herbarium, the Britton Herbarium, New York Botanical Garden, some material from the herbarium of Lingnan University, a selected loan from the United States National Herbarium, and a few essential specimens borrowed from the Royal Botanic Gardens, Kew. Mr. J. R. Sealy of Kew examined certain specimens in the Kew Herbarium, where the species involved had been described as having arillate seeds, and his findings confirm our conclusion in that none of the *Ormosia* species has arillate seeds. We are indebted to Dr. H. Humbert of the Museum of Natural History, Paris, France, for his courtesy in supplying fragments of the described Indo-Chinese species. We wish to take advantage of this opportunity to express our appreciation and gratitude to the officials of the several herbaria for their kind co-operation.

The types of the new species herein described, unless otherwise stated, are deposited in the herbarium of the Arnold Arboretum. The abbreviations adopted in this paper to indicate the herbaria in which the cited specimens are deposited are as follows:

A. Arnold Arboretum, Harvard University.
G. Gray Herbarium, Harvard University.
K. Royal Botanic Gardens, Kew.
L. Lingnan University, Canton.
N. Britton Herbarium, New York Botanical Garden, New York.
NA. National Arboretum Herbarium, U. S. Department of Agriculture, Washington.
P. Museum d'Histoire Naturelle, Paris.
U. United States National Herbarium, Washington.

Ormosia Jackson in Trans. Linn. Soc. **10**: 360. *t. 25–27*. 1811.—Benth. Fl. Hongk. 95. 1861.—Benth. & Hook. f. Gen. Pl. **1**: 556. 1865.—Taubert, Engl. & Prantl, Nat. Pflanzenfam. 3(3): 194. 1892.—Prain, Jour. As. Soc. Beng. **69**(2): 175. 1900 (Bot. Notes Pap. 385. 1901).—Chun, Chinese Econ. Trees. 185. 1922.

Toulichiba Adans. Fam. **2**: 326. 1763.

Layia Hook. & Arn. Bot. Beech. Voy. 182. *t. 38*. 1833, non *Layia* Hook. & Arn. op. cit. 142 (1833), 357 (1838), DC. Prodr. **7**: 294. 1838.

Hormosia Reichenbach, Repert. Herb. Nomencl. 154. 1841.

Macrotropis sensu Miq. Fl. Ind. Bat. Suppl. 302. 1862, non DC.

Chaenolobium Miq. Fl. Ind. Bat. Suppl. 302. 1862.

Arillaria Kurz, Jour. As. Soc. Beng. **42**(2): 70. 1873.

Podopetalum F. Muell. Melbourne Chem. Drugg. **5**: 12. 1882, Bot. Centralbl. **12**: 125. 1882; F. M. Bail. Queensl. Fl. **2**: 447. 1900; non Gaudin, 1828.

This is a distinctly natural group, in general easily recognizable by its floral and its fruit characters. Because numerous excellent generic descriptions have been published it has not been considered necessary to repeat these data here. Some modifications are mentioned in the text above, together with certain unusual characters that we have noted in certain species.

There are somewhat more than ninety known species, including those proposed and described as new in this paper. The generic range in the New World is from Mexico and the West Indies to Brazil and Peru, and in the Old World from Assam in northern India through western, central, and eastern China, southward and eastward through the Philippines and Malaysia to Sumatra, Java, Celebes, the Moluccas, New Guinea, the Palao Islands and Queensland, Australia. The few native African species that have been placed in *Ormosia* are now disposed of as representatives of the allied genera *Afrormosia* Harms and *Haplormosia* Harms.

The type of the genus is *Ormosia coccinea* Jackson, a native of British Guiana. In comparing the Old World and the New World species, while, as one would expect, there is no indication of specific identity as between Old World and New World forms, there is in general a rather remarkable similarity in the salient features of the American and the Asiatic species, but at the same time a rather broad range of variation in vegetative characters as well as those of flower, pod, and especially in the seed characters of the various representatives of the genus in the two widely separated geographic areas. The so-called "aril" that has been described for a few Old World species is discussed above, p. 85, our conclusion being that all described species of *Ormosia* have non-arillate seeds, although in one species, *O. robusta* (Roxb.) Wight, the fleshy seed coats were erroneously interpreted to represent an aril, and in two others, *O. macrodisca* Baker and *O. gracilis* Prain, the characteristic black basal parts of the seed coats were inadvertently characterized as representing an aril. In most of the Old World species the colored seeds are hard, smooth, and shining, although in a few cases the integuments are distinctly crustaceous or fleshy and easily separable from the cotyledons.

After considering possible subdivisions of the genus as represented in the area covered by this paper and examining such extra-limital material as was available to us, we abandoned the idea of arrangement under formal subgeneric and sectional names, and we have been content to group the included thirty-four species in fifteen series. For these we provide the following synopsis. After the synopsis of the series we present an artificial key to the species recognized. When more material is available this tentative arrangement will doubtless be greatly modified, for we would call attention to the fact that of the thirty-four species recognized, fifteen of them are known from single collections only, while of five the fruits are as yet unknown.

Synopsis of the series

A. Hilum small, 1–3 mm. long.

B. Testa in mature seeds crustaceous, often fragile, easily separable from the cotyledons, black, brown or red, when red more or less fleshy when fresh.

C. Testa black, castaneous or brown.

Series 1. Pachycarpae

Plants very pubescent; leaf-rachis not produced above the insertion of the upper pair of leaflets or, if produced, then very slightly so; pods inflated, densely velvety-pubescent externally, the valves thickly coriaceous; seeds black or black

tinged with brown or uniformly castaneous, never red, the testa usually very coarsely wrinkled when dry, somewhat shining, more or less crustaceous and easily separable from the cotyledons; seeds 1.5–2.5 cm. long.

This is a very uniform series, consisting of three closely allied species, *Ormosia pachycarpa* Champ., *O. inflata* Merr. & Chun, and *O. Merrilliana* Chen, the seed characters being totally different from those of all other series. In Prain's classification, *Ormosia pachycarpa* was placed in the subsection *Chaenolobium*, the other species of which, as far as known, have uniformly red seeds.

Series 2. Longipes

Glabrous or nearly glabrous, the leaflets chartaceous, the rachis produced; pods ellipsoid or oblong-ellipsoid, with a single large seed, the testa thin, crustaceous, pale brown, fragile, easily separable from the cotyledons, the valves coriaceous-crustaceous, glabrous, rugose, thin, only about 1 mm. thick.

A single species, *Ormosia longipes* Chen.

CC. Testa in mature seeds uniformly red.

Series 3. Fordianae

Pods large, compressed, glabrous, the valves very thickly coriaceous, usually stained red on the inside opposite the seeds; seeds 1–3, fairly large, ellipsoid, 2–3 cm. long, the red testa crustaceous, fragile, free from the cotyledons when dry, somewhat fleshy when fresh, simulating an aril.

A single species, *Ormosia Fordiana* Oliv.

BB. Testa indurated, not easily separable from the cotyledons, and never crustaceous, usually smooth and shining, sometimes wrinkled.

C. Seeds large, about 3 cm. long, the testa either jet black and with a red band surrounding the margins or uniformly mahogany-red.

Series 4. Crassivalvae

Pods with very thick, glabrous, woody, convex valves, strictly 1-seeded; seeds large, 3 cm. long, the testa hard, shining, uniformly black or black and brownish red, and with a distinct red band surrounding the margins, or uniformly mahogany-red.

Two species in Indo-China, *Ormosia crassivalvis* Gagnep. and *O. cambodiana* Gagnep.

CC. Seeds small, less than 2 cm. long, uniformly red when mature.

D. Leaves simple.

Series 5. Simplicifoliae

Leaves simple; pods compressed, glabrous, oblong-elliptic to obovate, the valves thickened (2 mm.), rugose when dry; seeds 1–3, oblong-ellipsoid, up to about 1.6 cm. long, the testa hard, red, somewhat shining, more or less coarsely rugose when dry, when mature often distinctly viscid.

A single species, *Ormosia simplicifolia* Merr. & Chun.

DD. Leaves pinnate.

E. Pods subcylindric, the valves much thickened.

Series 6. Striatae

Glabrous, the mature pods subterete, smooth, glabrous, woody, the valves much thickened (to at least 3 mm. thick), when more than one-seeded then non-septate or only partly septate between the seeds; calyx and ovary glabrous.

A single species, *Ormosia striata* Dunn.

Series 7. Pinnatae

Similar to the preceding, but the pods when more than one-seeded distinctly septate and depressed between the seeds, the calyx and ovary densely pubescent.

Two species, *Ormosia pinnata* (Lour.) Merr. and *O. indurata* Chen.

EE. Pods much compressed, never cylindric or subcylindric, the valves thick or thin.

F. Valves surrounded by a thick wing-like extension 5–15 mm. wide surrounding the seed-bearing part, which is but 2.5 cm. wide.

Series 8. Pachypterae

Pods obovate, compressed, glabrous, the valves thick, woody, their margins extended as a thick wing-like projection 5–15 mm. wide, but attenuate at the base, surrounding the at most 2.5 cm. wide seed-bearing parts, the seeds several, hard, smooth, red, shining, up to 1.5 cm. long.

Two species, *Ormosia pachyptera* Chen and *O. purpureiflora* Chen (fruits of the latter unknown).

FF. Valves not extended as a free projection beyond the seed-bearing parts.

Series 9. Xylocarpae

Pods strongly compressed, densely short-pubescent, the valves much thickened, woody, septate between the seeds; seeds hard, red, smooth, shining, one or few to as many as 9.

Two species, *Ormosia xylocarpa* Chun and *O. polysperma* Chen.

Series 10. Sericeolucidae

Pods strongly compressed, usually 1- or 2-seeded, the valves (immature) crustaceo-coriaceous, externally densely short-pubescent; in indumentum and in vegetative characters suggesting *Xylocarpae*.

One species, *Ormosia sericeolucida* Chen.

Series 11. Layia

Pods compressed, glabrous or nearly so, the valves somewhat thickened, rigid, more or less woody, normally several-seeded and septate between the seeds when more than 1-seeded, the hard red shining seeds one or few to many.

A rather incongruous assemblage consisting of *Ormosia emarginata* (Hook. & Arn.) Benth., *O. kwangsiensis* Chen, *O. Henryi* Prain, *O. formosana* Kaneh., *O. microphylla* Merr., and *O. olivacea* Chen. This is the genus *Layia* Hook. & Arn., typified by *Ormosia emarginata* (Hook. & Arn.) Benth, disposed of by Prain in the subsection *Layia* of *Ormosia* proper, subgenus *Toulichiba*.

Series 12. Amacrotropis

Not very different from the preceding series but the pods, when 2-seeded, not septate between the seeds.

A single species in China, *Ormosia yunnanensis* Prain. This series name was first proposed by Miquel, Fl. Ind. Bat. Suppl. 294. 1861, as a section of *Macrotropis*, as he realized that his species *Macrotropis sumatrana* Miq. = *Ormosia sumatrana* Prain differed from de Candolle's description of *Macrotropis* in having the vexillum as long as the other petals. It is typified by the first species that Miquel described, and Prain disposed of it as subsection *Amacrotropis* of section *Ormosia* proper, subgenus *Toulichiba*. *Macrotropis* as interpreted by Miquel is *Ormosia*, but *Macrotropis* DC. is, at least for the most part, a synonym of *Sophora* Linn.; see p. 115.

Series 13. Semicastratae

Stamens, as far as flowers are known, 5 only (only flowers of *O. semicastrata* Hance known), two to four very slender staminodes or sterile filaments being present; pods small (up to 2 cm. long), compressed or more or less inflated, strictly 1-seeded, suborbicular to elliptic, equilateral or more or less inequilateral, the valves crustaceo-coriaceous, not greatly thickened or woody; seeds small, usually slightly wider than long, the hilum small, less than 3 mm. long.

Five species, *Ormosia semicastrata* Hance, *O. apiculata* Chen, *O. cathayensis* Chen, *O. Howii* Merr. & Chun, and *O. nanningensis* Chen.

AA. Hilum large, 7–15 mm. long.

Series 14. Hosieae

Ovaries and pods glabrous, the latter ovate, compressed, 1- or rarely 2-seeded, the valves somewhat thickened, woody, the seeds normally wider than long, the testa uniformly red, hard, shining, smooth, the hilum elongated, prominent, about 7 mm. long.

A single species, *Ormosia Hosiei* Hemsl. & Wils.

Series 15. Balansae

Distinguished from all other series in its very long hilum, extending about halfway around the seed and 12 to 15 mm. long. Ovaries and pods densely pubescent, the latter more or less inflated, 1-seeded, the valves crustaceo-coriaceous, very tardily dehiscent or indehiscent, the seeds uniformly red, the testa hard, smooth, shining.

A single species, *Ormosia Balansae* Drake.

Unplaced species

A series of unrelated species of which only the flowers are known, or, in one case, very young fruits, the seeds not formed. A more definite placement of these must await the collection of additional material with mature or nearly mature fruits. Four species, all from Indo-China, *Ormosia euphorioides* Pierre, *O. hoaensis* Pierre, *O. tonkinensis* Gagnep., and *O. Tsangii* Chen.

Artificial key to the eastern Asiatic species of Ormosia

A. Leaves always simple (Hainan, Tonkin) .....8. *O. simplicifolia.*
A. Leaves pinnate.
  B. Seeds very large, solitary, 3 cm. long, the seed coats hard, smooth, shining, uniformly mahogany-red or jet black (sometimes somewhat mottled with red) and with a distinct red band surrounding the edges; mature pods glabrous, the valves convex, much thickened, woody.
    C. Pods 6–7 × 4.5 cm.; seeds jet black or black mottled with red, their margins with a distinct red band 2 to 5 mm. wide; leaflets shortly blunt-acuminate, somewhat pubescent beneath (Cochinchina) .....6. *O. crassivalvis.*
    C. Pods 6 × 2.8 cm.; seeds uniformly mahogany-red; leaflets slenderly and sharply caudate-acuminate, wholly glabrous (Cambodia) .....7. *O. cambodiana.*
  B. Seeds ellipsoid or oblong-ellipsoid, 2–2.5 cm. long (or when fresh 3 cm. long), the seed coats not indurated, when dry red, crustaceous, fragile and free or nearly free from the cotyledons, somewhat fleshy when fresh, simulating an aril; pods large, compressed, the valves often shining inside and more or less stained with red opposite the seeds (Kwangtung, Kwangsi, Yunnan, Tonkin) .....5. *O. Fordiana.*
  B. Seeds mostly smaller, never more than 2.5 cm. in diameter if globose or subglobose, mostly oblong, ellipsoid or orbicular and more or less compressed, and from less than 1 cm. to 1.8 cm. in length, one to many in a pod, the seed coats mostly very hard, smooth, shining and uniformly red, sometimes more or less crustaceous and free or nearly free from the cotyledons and if so then black, castaneous, or brown; pods various.

C. Seed coats black or black tinged with brown or castaneous, more or less crustaceous and free or nearly so, never greatly indurated, dull or more or less shining but never red, when dry smooth or very coarsely wrinkled; leaf-rachis not normally produced above the upper pair of leaflets or, if so, then very shortly; leaflets conspicuously pubescent beneath; pods more or less inflated, the somewhat leathery-thickened valves very densely subvelutinous-pubescent externally.

D. Seed coats uniformly castaneous, fragile, free; leaflets chartaceous (Hainan). 3. *O. inflata.*

D. Seed coats black, occasionally tinged with brown; leaflets coriaceous.

E. Indumentum on the branchlets, inflorescences, leaf-rachises, and lower surfaces of the leaflets very densely woolly (Hongkong) .....1. *O. pachycarpa.*

E. Indumentum on various parts of the plant dense but never woolly (Kwangtung, Kwangsi, Tonkin) .....2. *O. Merrilliana.*

C. Seed coats pale brown, thin, and fragile; valves crustaceous, glabrous; leaf-rachis strongly produced above the upper pair of leaflets; all parts of the plant (flowers unknown) glabrous (Yunnan) .....4. *O. longipes.*

C. Seeds mostly hard, small, uniformly red (or sometimes brownish when immature), the seed coats mostly hard, smooth or sometimes wrinkled when dry, shining, the seeds from less than 1 cm. to 1.5 or 1.8 cm. long or, if longer, then the red seed coats crustaceous when dry, fragile, and loose from the cotyledons; pods various; leaf-rachis mostly produced above the upper pair of leaflets.

D. Mature pods wholly glabrous or at most with a few scattered hairs; ovaries entirely glabrous or pubescent along their margins, rarely uniformly pubescent.

E. Leaflets conspicuously pubescent beneath, the indumentum uniformly distributed or sometimes confined to the midribs and lateral nerves.

F. Leaflets about 15, small, 2–4 × 1.5 cm., more or less appressed subferruginous-pubescent beneath (Kwangsi) .....21. *O. microphylla.*

F. Leaflets few to many, very much larger, 8–15 × 2.5–5 cm.

G. Leaflets about 17, membranaceous, olivaceous; pods about 3-seeded, 7 cm. long, the valves rather thinly coriaceous (Yunnan) .....22. *O. olivacea.*

G. Leaflets 5–11, coriaceous.

H. Pods much inflated opposite the seeds, 2–3.5 cm. long, about 1.5 cm. wide, 1- or 2-seeded; leaflets brown beneath, villous especially on the midrib and lateral nerves (Yunnan) .....23. *O. yunnanensis.*

H. Pods strongly compressed, 3–12 × 2.5–3.5 cm.; seeds usually many (up to a maximum of 10), sometimes in not well developed pods few only; leaflets pale, softly and uniformly pubescent beneath (central and southern China) .....19. *O. Henryi.*

E. Leaflets wholly glabrous or at most with a few widely scattered hairs beneath especially when young, never conspicuously and uniformly pubescent.

F. Pods ovoid to oblong, subcylindric or only very slightly compressed when mature, the valves very much thickened, woody; calyx and ovary glabrous (Yunnan, Burma) .....9. *O. striata.*

F. Pods various, mostly compressed, but if cylindric or subcylindric then the calyx and ovary densely pubescent.

G. Leaflets broadly obtuse or rounded, conspicuously retuse; calyces glabrous or very slightly pubescent outside, black when dry; pods mostly 2- or 3-seeded (Kwangtung, Kwangsi, Hainan, Tonkin) .....17. *O. emarginata.*

G. Leaflets acute or acuminate, or if the tips are sometimes also slightly emarginate the calyces brown, densely pubescent, and the pods strictly 1-seeded.

H. Leaflets 11–17.

I. Rachis without glands between the insertion of the leaflets; leaflets obtuse or subacute, never acuminate, very minutely apiculate; flowers purple; pods unknown (Kwangtung) .....13. *O. purpureiflora.*

I. Rachis with distinct glands on the upper surface between each pair of leaflets; leaflets slenderly subcaudate-acuminate and apiculate; pods obovate, woody, compressed, to 4.5 cm. wide, the edges of the valves extended as a thick wing-like projection 5 to 15 mm. wide, quite surrounding the seed-bearing part which is but 2.5 cm. wide (Kwangsi). 12. *O. pachyptera.*

H. Leaflets 3–9.

I. Seed coats red, crustaceous and free when dry, more or less fleshy when fresh, the seeds, when dry, up to 2.5 cm. long; pods 4–7 cm. long, about 5 cm. wide, the thickened valves pale and often shining inside, usually stained red opposite the seeds by the red testa (Kwangtung, Kwangsi, Yunnan, Tonkin) .....5. *O. Fordiana.*

I. Seed coats hard, smooth, shining, never crustaceous and free, the seeds 1 cm. long or less; pods various, not as above.

J. Pods 4–6.5 × 2–3 cm., ovate to oblong-ovate, strongly compressed; seeds mostly 2, the hilum 7 mm. long (Shensi, Hupeh, Szechuan, Kiangsu, sometimes planted) .....29. *O. Hosiei.*

J. Pods normally several-seeded, obovate to oblong, compressed or turgid or even subterete, 3–7 × 1.5–2.5 cm.; hilum less than 3 mm. long; flowers (as far as known) with 10 stamens.

K. Leaflets oblanceolate to oblong-oblanceolate, 2.5–6 cm. long; pods very woody, more or less turgid, mostly obovate to oblong-obovate (Kwangtung, Kwangsi) .....11. *O. indurata.*

K. Leaflets never oblanceolate-obovate or oblong-oblanceolate, 7–11 cm. long.

L. Pods almost cylindric when mature, or at least very turgid, the valves much thickened; seeds mostly 1.5–1.8 cm. long, the red testa wrinkled when dry; lateral nerves elevated beneath, distinctly prominent (Kwangtung, Hainan, Annam)..10. *O. pinnata.*

L. Pods much compressed, flat when mature; seeds 10–12 mm. long, the red testa hard, smooth, shining; lateral nerves not prominent.

M. Pods 1- or 2-seeded; ultimate reticulations lax, about 2 mm. in diameter, the ultimate veinlets distinctly elevated; leaflets glabrous beneath (Kwangsi) .....18. *O. kwangsiensis.*

M. Pods 2–5-seeded; ultimate reticulations crowded, indistinct, about 1 mm. in diameter, the ultimate veinlets scarcely elevated; leaflets minutely pubescent beneath with widely scattered short appressed hairs (Formosa) .....20. *O. formosana.*

J. Pods up to 2 cm. long, in general ovate to broadly elliptic-ovate, elliptic, or suborbicular, equilateral or inequilateral, strictly 1-seeded; hilum about 1 mm. long; flowers (as far as known) with 5 stamens.

K. Pods very strongly compressed, distinctly wider than long, with a prominent curved apiculum 4–6 mm. long (Kwangsi).
25. *O. apiculata.*

K. Pods, at least when mature, more or less inflated or turgid, always longer than wide, the apiculum short, straight or nearly so, 3 mm. long or less.

L. Pods equilateral or subequilateral, broadly elliptic to suborbicular, about 1.5 cm. long (Kwangtung, Kwangsi, Hainan).
24. *O. semicastrata.*

L. Pods distinctly inequilateral, mostly rhombic-ovate or subrhombic.

M. Pods about 1.5 cm. long and 1 cm. wide; leaf-rachis produced 1.2–2 cm. above the insertion of the upper pair of leaflets, the latter firmly chartaceous to subcoriaceous; nerves and reticulations very slender, scarcely elevated (Kwangtung).
26. *O. cathayensis.*

M. Pods about 2 cm. long and nearly as wide; leaf-rachis produced only 3–6 mm. above the insertion of the upper pair of leaflets, the latter thickly and rigidly coriaceous; nerves and reticulations more or less impressed on the upper surface and raised on the lower surface (Hainan) .....27. *O. Howii.*

D. Mature pods conspicuously and uniformly pubescent, the indumentum often short (pods unknown in *O. euphorioides, O. hoaensis* and *O. tonkinensis*); ovaries densely pubescent.[1]

[1] This character for *O. euphorioides* Gagnep. is uncertain, as in his original description as well as in his subsequent one and in his key, Gagnepain states that the ovary is glabrous on the sides and pubescent on the margins; yet his detailed figure of the ovary, Fl. Gén. Indo-Chine **2**: 509. *f. 49, 1–6.* 1920, depicts it as being densely pubescent on all parts except the very tip.

E. Leaflets entirely glabrous.
F. Leaflets large, mostly 3–6 cm. wide, rounded or obtuse, never acuminate (Cochinchina) .....32. *O. hoaensis.*
F. Leaflets smaller, mostly less than 3 cm. wide, always more or less acuminate.
G. Leaflets shining on the upper surface; pods very shortly and bluntly acuminate (Kwangsi) .....28. *O. nanningensis.*
G. Leaflets dull, the pods long rostrate-acuminate (Tonkin) ....34. *O. Tsangii.*
E. Leaflets distinctly pubescent or puberulent beneath, often densely so, the indumentum various but often restricted to short, appressed, shining, densely arranged or scattered hairs.
F. Leaflets 5–9, firmly chartaceous or subcoriaceous, the indumentum on the lower surface pilose or tomentose, the hairs more or less elongated, not strictly appressed.
G. Leaflets 5–9, subchartaceous, 3–6 cm. long, shortly and bluntly acuminate, the nerves beneath very prominent (Tonkin) .....33. *O. tonkinensis.*
G. Leaflets 5–7, subcoriaceous, 6–10 cm. long, usually attenuate-obtuse, the nerves beneath slender but not particularly prominent (Cochinchina). 31. *O. cuphorioides.*
F. Leaflets 3–7, rigidly coriaceous, the indumentum consisting of dense or scattered, very short, usually closely appressed shining hairs.
G. Hilum short, at most 2 mm. long.
H. Seeds 1 or at most 2; valves crustaceo-coriaceous, about 1 mm. thick; leaflets densely and uniformly short appressed-pubescent beneath (Kwangsi) .....16. *O. sericeolucida.*
H. Seeds normally several, up to as many as 9, sometimes one only; valves much thickened, very woody.
I. Leaflets 4–8 cm. long; mature seeds often distinctly viscid (Hainan). 14. *O. xylocarpa.*
I. Leaflets 8–15 cm. long; seeds (immature) not viscid (Kwangtung, Kiangsi, Kwangsi) .....15. *O. polysperma.*
G. Hilum very long, extending about halfway around the seed and up to 15 mm. in length; pods ovate to orbicular-ovate, tardily dehiscent (or perhaps even indehiscent), 1- or rarely 2-seeded, the valves thin; leaflets large, 8–15 cm. long (Kwangsi, Hainan, Tonkin) .....30. *O. Balansae.*

Series 1. Pachycarpae

1. **Ormosia pachycarpa** Champ. ex Benth. Hook. Jour. Bot. Kew Gard. Miscel. **4**: 76. 1852; Benth. Fl. Hongk. 96. 1861; Forbes & Hemsl. Jour. Linn. Soc. Bot. **23**: 204. 1887; Prain, Jour. As. Soc. Bengal **69**(2): 184. 1900 (Bot. Notes Pap. 394. 1901); Dunn & Tutch. Kew Bull. Add. Ser. **10**: 88. 1912; Chun, Sci. Jour. Col. Sci. Sunyatsen Univ. **2**(3): 56. 1930; Tsiang, Jour. Forest. Assoc. China **3**: 43. 1930; Hu & Chun, Ic. Pl. Sin. **4**: 16. *t. 166.* 1935.

China: Hongkong, *Ford s.n.* (A, N), *Hongkong Herb. 7259* (A), *W. Y. Chun 6073, 7453* (A).

In the original description the binomial was published thus: "*Ormosia ?* (*Marquartia ?*) *pachycarpa* Champ., sp. n." The species being a true *Ormosia,* the question mark is eliminated; *Marquartia* Vogel is a synonym of *Millettia* Wight & Arn. The species is characterized by having the lower surface of the leaflets, the petioles, the inflorescences, and the outside of the pods covered with a dense felt-like indumentum. While Champion described the seeds as brownish red and Hu and Chun repeat this, stating that they are 1.8 to 2.5 cm. long, fully mature seeds of our Hongkong specimens are mostly subglobose to irregularly ovoid, black or with a somewhat brownish tinge, and 1.5 to 2 cm. long; the seed coats are distinctly crustaceous and, although firm, are easily separable from the cotyledons. The species is known only from Hongkong. Prain placed this species in his subgenus *Toulichiba,* section *Chaenolobium* (Miq.) Prain, the group being characterized by the leaf-rachis not being produced above the in-

sertion of the upper pair of leaflets, but several of the specimens above cited have leaves with the rachis shortly produced and others not at all produced, even on the same branchlet, thus providing evidence that this character alone is not a sufficiently dependable one on which to establish subdivisions of *Ormosia*. *Chaenolobium* was proposed by Miquel (as a genus) to take two Sumatran species, *C. septemjugum* Miq. = *Ormosia septemjuga* Prain and *C. decemjugum* Miq. = *O. decemjuga* Prain, of which Miquel did not describe the seed characters, although he did have pods of the latter. As far as we know the seeds have never been described, and we can only assume that they are red. *O. venosa* Prain and *O. polita* Prain, placed in *Chaenolobium* by Prain, have hard red seeds.

2. **Ormosia Merrilliana** Chen, sp. nov.

Arbor 6–16 m. alta; ramis glabris vel subglabris, ramulis densissime breviter ferrugineo-pubescentibus; foliis pinnatis, 25–30 cm. longis, rhachi tomentosa, ultra jugum ultimum foliolorum haud producta; foliolis 5–9, subcoriaceis, late oblongo-oblanceolatis, oblanceolatis, vel oblongo-ellipticis, 9–20 cm. longis, 3.5–6 cm. latis, breviter sed distincte acuminatis, deorsum plerumque plus minusve angustatis, basi cuneatis vel late acutis, supra pallide olivaceis, glabris, costa impressa, subtus subcinereo- vel luteo-brunneis, densissime uniformiter breviter velutino-tomentosis; nervis primariis utrinsecus 12–17, utrinque distinctis, supra planis, subtus elevatis, ad marginem arcuato-anastomosantibus, venulis secundariis subtus distinctis, reticulatis; petiolulis 5 mm. longis, crassis, densissime breviter pubescentibus; inflorescentiis terminalibus, paniculatis, dense tomentosis, ad 30 cm. longis, ramis primariis paucis, patulis, inferioribus ad 12 cm. longis, pedicellis 5 mm. longis, bracteis bracteolisque deciduis; floribus parvis, calycis lobis oblongis, 4 mm. longis, 3 mm. latis, dense ferrugineo-tomentosis; petalis glabris, vexillo breviter unguiculato, late orbiculari, 1.2 cm. longo, obovato, basi late acuto haud auriculato, breviter unguiculato, alis carinisque longe (3.5 mm.) unguiculatis, carinarum laminis 2.8 mm. latis, basi uno latere leviter auriculatis, altero acutis, alarum laminis late oblongis, aequilateralibus, basi late rotundatis leviter biauriculatis; staminibus 10, liberis, filamentis glabris, 6–12 mm. longis; ovario oblongo-ovoideo, sessili, dense villoso, 1-ovulato; stylo filiformi, 10 mm. longo, uno latere ad basim pubescente; leguminibus orbiculari-ovoideis vel obovoideis, 1-spermis, inflatis, ad 4 cm. longis, 2.5–3.5 cm. latis, saltem 1.5 cm. crassis, haud stipitatis, basi late rotundatis, apice obtusis vel breviter apiculatis, valvis crasse coriaceis, extus in sicco laxissime rugosis, subcastaneis, densissime subvillosis, pilis longioribus nitentibus, intus conspersissime villosis; seminibus solitariis, atro-castaneis vel atris, subnitidis, duris, in sicco laxe rugosis, suborbiculari-obovoideis, leviter compressis, 1.7–2 cm. longis, 2–2.5 cm. latis, 1–1.2 cm. crassis, hilo minuto, 1 mm. longo.

China: Kwangtung, Yamchow, *K. K. Ts'oong 1921* (A); Kung P'ing Shan, Fang Ch'eng District, on the Kwangtung-Tonkin border, *W. T. Tsang 28615,* Sept. 1–9, 1936, a tree 6 m. high, fairly common in thickets on dry clayey soil, fruits brown; Kwangsi, Shap Man Taai Shan, Na Wai Village, southeast of Shangsze, Shangsze District, on the Kwangtung border, *W. T. Tsang 23839* (type A), July 11–30, 1934, fairly common in thickets. Indo-China: Tonkin, Taai Wong Mo Shan, immediately south of the juncture of the Kwangtung-Kwangsi-Tonkin boundaries, *W. T. Tsang 27144* (A), Nov. 19, 1936, fairly common in thickets, fruit brownish yellow.

This species, manifestly allied to *Ormosia pachycarpa* Champ. of Hongkong, is well characterized by its large leaflets, their shape and indumentum, and by its inflated, 1-seeded pods, the rather large seeds being black as in Champion's species rather than red as in most of the other species of the genus in Asia and Malaysia.

3. **Ormosia inflata** Merr. & Chun in herb. sp. nov.

Ormosia inflata Merr. & Chun ex Tanaka & Odashima, Jour. Soc. Trop. Agr. **10**: 369. 1938 (Contr. Hort. Inst. Taihoku Univ. **24**: 369), *nomen nudum.*

Arbor 6–10 m. alta, ramulis et subtus foliis et inflorescentiis perspicue dense pubescentibus, ramis incrassatis, glabris, teretibus, ramulis ultimis circiter 2 mm. diametro, subdense breviter pubescentibus; foliis pinnatis, 12–18 cm. longis, rhachi ultra jugum foliolorum ultimum haud producta, petiolis dense breviter pubescentibus; foliolis 5–7, chartaceis, oblongo-oblanceolatis, oblongis, vel oblongo-ellipticis, 6–11 cm. longis, 1.5–3.5 cm. latis, graciliter acute acuminatis, basi acutis, in sicco supra viridibus, glabris, subtus subferrugineis vel brunneis, perspicue pubescentibus, costa supra impressa, subtus valde elevata, nervis primariis utrinsecus 10–15, supra obscuris, subtus elevatis, perspicuis, ad marginem arcuato-anastomosantibus, reticulationibus distinctis; petiolulis dense pubescentibus, 3–5 mm. longis; inflorescentiis paniculatis, circiter 15 cm. longis, dense pubescentibus, multifloris, ramis primariis paucis, ad 9 cm. longis; floribus albidis, circiter 1.2 cm. longis, breviter pedicellatis, calycibus extus dense brunneo-tomentosis, tubo circiter 4 mm. longo, lobis ovatis vel oblongo-ovatis, obtusis, 3–4 mm. longis, 2–3 mm. latis, utrinque dense villosis; vexillo suborbiculari, retuso, circiter 10 mm. diametro, basi late rotundato, abrupte decurrente, haud calloso, unguiculo 2.5 mm. longo; alis carinisque plus minusve inaequilateralibus, apice obtusis, circiter 4 mm. latis, basi uno latere acutis, altero distincte auriculatis, unguiculis circiter 3 mm. longis; staminibus 10, filamentis liberis, glabris; ovario inaequilateraliter oblongo-ovoideo, densissime villoso, 2- vel 3-ovulato, stylo ad 12 mm. longo, deorsum leviter villoso; fructibus inflatis, ovoideis vel ellipsoideis, 3–5 cm. longis, 2–2.5 cm. latis, circiter 1.5 cm. crassis, valvis crasse coriaceis, intus glabris, extus densissime brunneo-tomentosis; seminibus solitariis vel binis, subellipsoideis vel suborbicularibus, castaneis, nitidis, 1.5 cm. longis, leviter compressis, ad 1 cm. crassis, tegumento in sicco crustaceo, fragili, e cotyledonibus facile secedibili, hilo 1 mm. longo.

China: Hainan, Po-ting, *F. C. How 72604, 73973* (A), May 26 and Nov. 3, 1935, in forests along streams, altitude about 350 m., *S. K. Lau 28020* (A type, N), Oct. 17, 1936., a tree about 6 m. high.

A third species in the group with *Ormosia pachycarpa* Champ., characterized by its slenderly acuminate leaflets, but having much the aspect and many of the characters of Champion's Hongkong species. The seed coats are shining and uniformly castaneous when dry, not black as in the two preceding species, very easily separable from the cotyledons and distinctly more fragile than in *O. pachycarpa* Champ. and *O. Merrilliana* Chen.

Series 2. Longipes

4. **Ormosia longipes** Chen, sp. nov.

Arbor circiter 6 m. alta, ramis brunneis, glabris, ramulis glabris vel obscure pubescentibus; foliis pinnatis, 25–36 cm. longis, rhachi glabra vel subglabra, ultra jugum foliolorum ultimum 3–15 mm. producta; foliolis 7, chartaceis, glaberrimis, anguste oblongis vel late oblongo-lanceolatis, 12–20 cm. longis, 2.5–5.5 cm. latis, apice sat distincte graciliterque acuminatis, basi acutis vel cuneatis, supra viridibus vel olivaceis, subtus pallidis; venis primariis utrinsecus 8–10, perspicuis, adscendentibus, subtus elevatis, arcuato-anastomosantibus; petiolulis crassis, rugosis, 5–8 mm. longis; inflorescentiis ut videtur paniculatis, pauciramosis, ramis (saltem sub fructu) 22 cm. longis, glabris; leguminibus stipitatis (stipite ad 5 mm. longo) ellipsoideis vel oblongo-ellipsoideis, 3.5–4 cm. longis, 2.5 cm. latis, ad 2 cm. crassis, valvis coriaceis, subcrustaceis, subinduratis, circiter 1 mm. crassis, brunneis vel nigris, glabris, rugosis; seminibus solitariis vel binis, ob-

longis vel ovoideis, circiter 2–2.5 cm. longis et 1.5 cm. latis, tegumento in sicco crustaceo, pallide brunneo, fragili, e cotyledonibus facile secedibili.

CHINA: Yunnan, southeast of Mengtze, *Henry 11854* (A TYPE, N), a tree about 20 feet high in forests, alt. about 1500 m. The New York sheet is marked as from Wa Ke, Chinese collector *Ho*.

A species not closely allied to any other one known to us, characterized by being glabrous or nearly so (flowers unknown), as well as by its scarcely compressed, 1-seeded, ellipsoid to oblong-ellipsoid pods, distinctly thin, glabrous and rugose, somewhat fragile valves, and its large seeds, the seed coats being pale brown when dry, not black or red, thin, crustaceous, fragile, and easily separable from the cotyledons.

Series 3. FORDIANAE

5. **Ormosia Fordiana** Oliv. Hook. Ic. **25**: *t. 2422*. 1895; Dunn & Tutch. Kew Bull. Add. Ser. **10**: 88. 1912; Merr. Lingnan Sci. Jour. **5**: 91. 1928; Chun, Sci. Jour. Col. Sci. Sunyatsen Univ. **2**(3): 54. 1930; Hu & Chun, Ic. Pl. Sin. **4**: 17. *t. 167*. 1935.

INDO-CHINA: Tonkin, Sai Wong Mo Shan, *W. T. Tsang 29987, 30063* (A). CHINA: Kwangtung, *Y. Tsiang 791* (A, N, U), *1539* (A, N, L); Hainan, *CCC 8132* (*McClure*) (A, N), *CCC 9756* (*McClure*) (N), *LU 17859* (*Tsang & Fung*) (A, N), *18027* (*Tsang & Fung*) (A), *C. Wang 35758* (A, N), *F. C. How 70397* (A, N), *72403, 72421, 72898, 72949, 73329* (A); Kwangsi, *R. C. Ching 7393* (A, U), *7866* (N, L), *8480* (A, N, U), *W. T. Tsang 22060, 23210* (A), *H. Y. Liang 69826* (A); Yunnan, *H. T. Tsai 61801* (A), *C. W. Wang 78153, 79496* (A).

Ormosia Fordiana Oliv. is distinguished by its large, compressed, woody pods which are smooth and shiny inside, often ivory-like in color and stained more or less reddish opposite the seeds. The seed character is strongly contrasted to the majority of the species in that the seed coats, instead of being hard, smooth and shining, while uniformly red, are crustaceous and fragile when dry, free from the cotyledons, thus simulating an aril, and when fresh somewhat fleshy as in *Ormosia robusta* (Roxb.) Wight, although not in the slightest allied to the latter species in other characters. The seeds are ellipsoid, 1.5–2.5 cm. long.

Series 4. CRASSIVALVAE

6. **Ormosia crassivalvis** Gagnep. Not. Syst. **3**: 29. 1914, et in Lecomte, Fl. Gén. Indo-Chine **2**: 513. 1920.

INDO-CHINA: Cochinchina, *Thorel 1415* (A, U), TYPE COLL., from the Saigon River and the Cai-cong forest.

Ormosia crassivalvis Gagnep. seems clearly to be closely allied to the next species. Both have similar, glabrous, 1-seeded pods, the valves being very woody and much thickened, convex, the seeds of each being unusually large and 3 cm. long. The pods of *O. crassivalvis* Gagnep. are larger (6–7 × 4.5 cm.) as compared with 6 × 2.8 cm. for *O. cambodiana* Gagnep. The seeds were described by Gagnepain in 1914 as "atro-purpureum, margine obtuso coccineo" and in 1920 as "luisante, acajou foncé, rouge carmin sur la pourtour." One seed from the type collection that we have seen conforms reasonably well to these descriptions except that the surface is partly black, but another has jet black shining seeds with no traces of red except the conspicuous red margins, which are from 2 to 5 mm. wide. The hilum is about 2 mm. long. The specimens that we have seen of *Ormosia cambodiana* Gagnep. lack the seeds, but these were described by Gagnepain as "atro-purpureum" and as "rouge-acajou." In both species the rachis is extended 1–1.8 cm. above the insertion of the upper pair of leaflets. In *Ormosia crassivalvis* Gagnep. the leaflets are merely blunt-

acuminate and more or less pubescent beneath, while in *O. cambodiana* Gagnep. they are slenderly and sharply caudate-acuminate and entirely glabrous.

7. **Ormosia cambodiana** Gagnep. Not. Syst. **3**: 29. 1914, et in Lecomte, Fl. Gén. Indo-Chine **2**: 513. 1920.

INDO-CHINA: Cambodia, Talung Mountain, near Kampot, *Pierre s.n.* (U, fragm. A), TYPE COLL.

Known only from the type collection; the species is discussed under the preceding one.

Series 5. SIMPLICIFOLIAE

8. **Ormosia simplicifolia** Merr. & Chun in herb. sp. nov.

Ormosia obscurinervia Merr. & Chun, ex Tanaka & Odashima, Jour. Soc. Trop. Agr. **10**: 369. 1938 (Contr. Hort. Inst. Taihoku Univ. **24**: 369), *nomen nudum.*

Arbor parva, ad 5 m. alta, glabra, ramis ramulisque teretibus, ramulis ultimis 1–1.5 mm. diametro; foliis semper simplicibus, chartaceis vel subcoriaceis, oblongis vel lanceolatis, plerumque graciliter acuminatis (saepe caudato-acuminatis), basi acutis vel subobtusis, 6–25 cm. longis, 2–6 cm. latis, in sicco pallidis vel pallide olivaceis, subtus pallidioribus, utrinque glaberrimis; nervis primariis utrinque 8–10, gracilibus, obscuris, curvatis, obscure arcuato-anastomosantibus, saepe obsoletis vel subobsoletis, reticulis obsoletis; petiolo 4–8 mm. longo, rugoso; inflorescentiis terminalibus vel in axillis superioribus, plerumque depauperato-paniculatis, interdum simpliciter racemosis, ramis primariis paucis, 4–6 cm. longis, circiter 10 cm. longis, obscure pubescentibus vel glabris; floribus roseis, graciliter pedicellatis, circiter 1.5 cm. longis, calycibus breviter consperse adpresse pubescentibus, tubo circiter 4 mm. longo, lobis oblongis, obtusis, circiter 6 mm. longis, 3.5–4 mm. latis, intus obscure pubescentibus vel subglabris; petalis circiter 15 mm. longis, vexillo late ovato, ad 15 mm. lato, apice leviter retuso, basi latissime truncato-rotundato, distincte bicalloso, unguiculo 2 mm. longo; alis carinisque inaequilateraliter oblongo-oblanceolatis, 5 mm. latis, apice rotundatis, basi haud auriculatis, unguiculis ad 4 mm. longis; staminibus 10, filamentis liberis, glabris, 8–15 mm. longis; ovario oblanceolato vel oblongo-lanceolato, 4-ovulato, glabro, stylo glabro, 6–7 mm. longo; leguminibus compressis, glabris, oblongo-ellipticis vel obovatis, 3–4.5 cm. longis, 2–2.5 cm. latis, dehiscentibus, valvis sublignosis, ad 2 mm. crassis, acutis, acuminatis, vel obtusis, basi plerumque acutis; seminibus 1–3, oblongo-ellipsoideis, rubris, duris, nitidis, in sicco plus minusve rugosis, interdum distincte viscosis; hilo 1.5 mm. longo.

INDO-CHINA: Tonkin, Taai Wong Mo Shan and vicinity, near Chuk-phai, Hai-coi, *W. T. Tsang 29144* (TYPE A), June 1–9, 1939, a fairly common shrub growing in thickets, moist clayey soil, flowers rose, fragrant; also from the same general locality, *W. T. Tsang 27255, 29112, 29341* (A); Pac-si, northeast of Mon-cay, *W. T. Tsang 26932* (A), Oct. 1–8, 1936; Sai Wong Mo Shan (Sai Vong Mo Leng), near the juncture of the Tonkin-Kwangtung-Kwangsi boundaries, *W. T. Tsang 29991, 30725* (A), Oct.–Nov. 1940. CHINA: Hainan, Po-ting, *F. C. How 72498, 72753* (A), May 20 and June 5, 1935, in forested ravines, alt. about 450 m., these with immature fruits.

This species is distinguished from all known representatives of the genus by its characteristic strictly simple leaves, all other described species now retained in *Ormosia* having pinnate leaves; yet in all essential characters it is strictly an *Ormosia* as that genus is at present interpreted. The mature seeds are frequently distinctly viscid when dry, a character we have otherwise observed in *Ormosia* only in the entirely different *O. xylocarpa* Chun. The Hainan form has leaves somewhat smaller than the Indo-Chinese plant and more stoutly acuminate, ranging from 6 to 12 by 2 to 4.5 cm. in size. The pods, as in many other species of the genus, vary considerably in shape and size, as well as in the number of seeds.

Series 6. STRIATAE

9. **Ormosia striata** Dunn, Jour. Linn. Soc. Bot. **35:** 492. 1903; Prain, Jour. As. Soc. Bengal **73**(2): 46. 1904; Lace & Rodger, List Trees Shrubs Burma 58. 1922 (err. *stricta*).

CHINA: Yunnan, *Henry 11886* (A), *12843* (A, N), *12979* (A, N, U), *12979A* (A, U), *12979B* (A, N). Also Burma.

The listed numbers are iso-syntypes. The ovary is glabrous. The hard red shining seeds are about 12 mm. long and the hilum is 2 mm. in length. The species, when bearing fully mature pods, is curiously similar to *Ormosia pinnata* (Lour.) Merr., but its flowers are smaller, 1 cm. long, while the calyces are glabrous outside. When immature the pods are somewhat compressed, but when mature they are nearly cylindric, non-septate or only partly septate between the seeds when more than one-seeded. In *Ormosia pinnata* (Lour.) Merr. the ovaries and calyces are densely pubescent. This is the type of Prain's subsection *Striatae,* l.c.

Series 7. PINNATAE

10. **Ormosia pinnata** (Lour.) Merr. Lingnan Sci. Jour. **14:** 12. 1935, Trans. Am. Philos. Soc. II. **24**(2): 192. 1935.

Cynometra pinnata Lour. Fl. Cochinch. 268. 1790, ed. Willd. 329. 1793; Gagnep. in Lecomte, Fl. Gén. Indo-Chine **2:** 155. 1913.

Ormosia hainanensis Gagnep. Not. Syst. **3:** 31. 1914, et in Lecomte, Fl. Gén. Indo-Chine **2:** 511. 1920; Merr. Philip. Jour. Sci. **15:** 240. 1919, Lingnan Sci. Jour. **5:** 91. 1928; Chun, Sci. Jour. Col. Sci. Sunyatsen Univ. **2**(3): 52. 1930; Hand.-Maz. Oesterr. Bot. Zeitschr. **80:** 342. 1931.

INDO-CHINA: Annam, Tourane, *Clemens 4015* (A, N). CHINA: Kwangtung, Kochow region, *CCC 2664* (*To & Fuson*) (N, L); Hainan, *Hongkong herb. 443* (A, U), *CCC 7718* (*McClure*) (A), *LU 15698, 16196* (*Tsang*) (A, N, L), *H. Fung 20371* (A, N), *C. I. Lei 91, 790* (N), *S. K. Lau 356, 1141* (A, N), *2652, 2836, 27283, 27443, 27641* (A), *N. K. Chun & C. L. Tso 43544* (N), *43848, 44088* (A, N), *C. L. Tso 70414* (N), *F. C. How & N. K. Chun 70128* (N), *70158, 70207* (A, N), *F. C. How 72995* (N), *C. Wang 32859* (A, N), *32902, 33738, 33946, 35487, 36458* (N), *H. Y. Liang 62042, 63327* (A, N), *63025 63230, 63336, 63338, 63470, 64621, 66329, 66571* (N), *Gressitt 1046* (A), *L. Tang 443* (A). A small tree in forests at Fan Yah, Sha Po Shan, Yaichow, and other localities, apparently common in Hainan.

Gagnepain, in Lecomte, Fl. Gén. Indo-Chine **2:** 155. 1913, left Loureiro's species under *Cynometra,* stating: "Espèce très douteuse, appartenant peut-être à un autre genre." Merrill, Lingnan Sci. Jour. **14:** 12. 1935, Trans. Am. Philos. Soc. II. **24**(2): 191. 1935, discussed the species, and correctly, we believe, transferred it to *Ormosia,* making *O. hainanensis* Gagnep. a synonym. Loureiro's description of the fruit as "lunatum" is not good, although occasionally a 1-seeded pod does suggest this shape; this descriptive word was probably taken from the generic description of *Cynometra,* or added to make the species description conform to the characters of *Cynometra.* It should be noted, in reference to Loureiro's species, that the cited *Clemens* specimen, which clearly represents the same species as the Hainan form, came from the general vicinity of his place of residence in Annam, and in interpreting *Cynometra pinnata* Lour. it is significant that Loureiro described its seeds as "rubro." The pods vary greatly in size and somewhat in shape, being 1–4-seeded. Handel-Mazzetti described them in 1931, but Merrill's description of 1919 is better. Immature fruits are compressed and very slightly pubescent, but mature ones are almost terete, glabrous, ovoid and usually rostrate when 1-seeded, cylindric and merely apiculate when several-seeded, sometimes obscurely torulose between the seeds, 3–8 cm. long, 2–2.5 cm.

wide, and 2–2.5 cm. thick, the valves very woody, much thickened, septate between the seeds, pale or dark-brown, and more or less verruculose when dry; seeds 1–4, ellipsoid to oblong-ellipsoid, 1.5–1.8 cm. long, bright red when mature, the testa hard, usually wrinkled when dry, the hilum about 2 mm. long. In many respects this species resembles *Ormosia striata* Dunn, but its flowers are a third longer, and the calyces and ovaries are densely pubescent.

11. **Ormosia indurata** Chen, sp. nov.

Arbor parva, 5–9 m. alta, ramis in sicco atris, glabris, teretibus, ramulis junioribus glabris vel sursum obscure breviter pubescentibus; foliis pinnatis, 8–10 cm. longis, rhachi glabra, ultra jugum ultimum foliolorum breviter (1–5 mm.) producta, raro haud producta; foliolis 7–9, oblanceolatis vel late oblongo-oblanceolatis, 3.5–6 cm. longis, 7–20 mm. latis, breviter obtuse acuminatis, deorsum angustatis, basi cuneatis, margine leviter revolutis, utrinque glabris, supra pallide viridibus vel pallide olivaceis, subtus pallidioribus; nervis primariis utrinque 4–6, gracilibus, supra obscuris, subtus paullo elevatis, adscendentibus, venulis arcte reticulatis; petiolulis 4–5 mm. longis, rugosis, glabris vel obscurissime pubescentibus; paniculis terminalibus, erectis, immaturis circiter 5 cm. longis, cum alabastris obovoideis valde immaturis dense breviter adpresse subferrugineo-pubescentibus; ovario dense cinereo-pubescente, 4-ovulato; leguminibus ligneis, subturgidis, obovatis vel oblongis, 3.5–4.5 cm. longis, 2–2.5 cm. latis, valvis ligneis, incrassatis, extus subconvexis, breviter apiculatis, basi stipitatis, junioribus plus minusve breviter pubescentibus, maturis glabris vel subglabris; seminibus 1 vel 2, ellipsoideis, duris, nitidis, rubro-brunneis, levibus, leviter compressis, ad 1 cm. longis et 7 mm. latis, hilo 2 mm. longo.

China: Kwangtung, Lin Fa Shan, Sam Hang Shek T'au village, Hwei-yang District, *W. T. Tsang 25830* (type A), Sept. 12–30, 1935, a tree about 9 m. high, fairly common; Kwangsi, Shap Man Taai Shan, southeast of Shangsze, Shangsze District, on the Kwangtung border, *W. T. Tsang 22314* (A), a specimen with immature flower buds, the leaflets larger than in the holotype (5–6 × 2 cm. as compared with 3.5–5 × 0.7–1.5 cm.).

A species characterized by its small, oblanceolate to broadly oblanceolate leaflets and its turgid somewhat woody 1- or 2-seeded pods which at first are shortly pubescent, at maturity glabrous or nearly so, and its brownish red rather than bright red seeds.

Series 9. Pachypterae

12. **Ormosia pachyptera** Chen, sp. nov.

Arbor circiter 8 m. alta, subglabra (floribus ignotis), ramis ramulisque glabris incrassatis; foliis pinnatis, 25–27 cm. longis, rhachi glabra ultra jugum ultimum foliolorum brevissime (2–3 mm.) producta, glandulis minutis inter foliola jugi cujusvis insignita; foliolis 15–17, subcoriaceis, lanceolatis vel anguste oblongis, 5.5–8.5 cm. longis, 2–2.4 cm. latis, graciliter acuminatis, acuminibus acute apiculatis, basi acutis, supra olivaceis, glabris, haud nitidis, subtus subglaucis, minute consperseque breviter adpresse pubescentibus glabrescentibus; nervis primariis utrinque 5–7, gracilibus, subobscuris, curvato-adscendentibus, subtus paullo elevatis, obscure anastomosantibus; petiolulis 5 mm. longis, glabris, rugosis; inflorescentiis ut videtur paniculatis (floribus ignotis); leguminibus stipitatis, obovatis, compressis, apice latissime rotundatis, abrupte breviter crasseque acuminatis, deorsum angustatis, basi acutis, 6 cm. longis, 4.5 cm. latis, circiter 1 cm. crassis, 2-spermis, valvis atris, marginibus crassissime alatis, alis vel margine productis duris 5–15 mm. latis, deorsum angustatis, partibus seminiferis circiter 2.5 cm. latis; seminibus ellipsoideis, rubris, nitidis, duris, levibus, leviter compressis, circiter 1.5 cm. longis et 1 cm. latis, hilo 2.5 mm. longo.

China: Kwangsi, Chen Pien District, *S. P. Ko 55924* (type A), Oct. 17, 1935, a tree about 8 m. high on thinly forested slopes, altitude about 900 m.

This species is characterized by its numerous lanceolate or narrowly oblong, slenderly acuminate, and sharply apiculate leaflets, the rachis only slightly produced above the insertion of the upper pair of leaflets, and with a small but distinct gland on the upper surface of the rachis between each pair of petiolules, the latter a character that we have not observed in any other species of the genus. The obovate, compressed, indurated, glabrous pods are also very characteristic and are totally different from those of all the other known Chinese species in that the thickened edges of the valves extend quite around each valve as a wing-like projection from the seed-bearing parts, the latter being but 2.5 cm. wide, this extension varying from 5 to 15 mm. wide, gradually disappearing towards the acute base.

13. **Ormosia purpureiflora** Chen, sp. nov.

Frutex vel arbor parva, ramis glabris, ramulis obscure breviter pubescentibus; foliis pinnatis, circiter 20 cm. longis, rhachi ultra jugum ultimum foliolorum 8–10 mm. producta; foliolis 11–13, oblongis, 6–9.5 cm. longis, 2–2.5 cm. latis, acutis vel subobtusis, minutissime apiculatis, basi late acutis vel obtusis, subcoriaceis, in sicco supra olivaceis, glabris, costa valde impressa, subtus pallidis, obscure cinereo-pubescentibus, costa valde elevata; nervis primariis utrinque 5–8, subtus elevatis, curvato-adscendentibus, arcuato-anastomosantibus, venulis utrinque arcte reticulatis sed vix perspicuis; petiolulis glabris subglabrisve, rugosis, 5 mm. longis; inflorescentiis paniculatis, 12–20 cm. longis, consperse breviter subadpresse griseo-pubescentibus; floribus circiter 15 mm. longis, purpureis; calycibus lobis oblongo-ovatis, 3–4 mm. longis, 2.5–3 mm. latis, late acutis vel obtusis, extus consperse breviter adpresse pubescentibus, intus leviter cinereo-pubescentibus; vexillo orbiculari-ovato, circiter 1.5 cm. diametro, basi latissime truncato-rotundato haud calloso, unguiculo circiter 2 mm. longo; alis carinisque basi biauriculatis, carinis in marginibus exterioribus sursum leviter pubescentibus; staminibus 10, inaequalibus, filamentis 8–15 mm. longis, glabris, liberis; ovario sessili, oblongo, glabro, 6-ovulato; leguminibus ignotis.

CHINA: Kwangtung, Naam Kwan Shan, Lung-men District, *W. T. Tsang 25362* (TYPE A), June 1–9, 1935, fairly common, flowers purple, odorless.

Ormosia purpureiflora Chen and *O. pachyptera* Chen, although their types are not strictly comparable, one being in fruit and the other in flower, are apparently closely allied species, and because of the great similarities in the general appearance of the two specimens in their vegetative characters, we have placed *Ormosia purpureiflora* in the same series as *O. pachyptera*. The leaflet-tips of the two are distinctly different, while *Ormosia purpureiflora* has no glands on its leaf-rachis, the presence of a small but distinct gland on the upper surface of the rachis between the insertion of each pair of petiolules being one of the characters of *O. pachyptera*.

Series 9. XYLOCARPAE

14. **Ormosia xylocarpa** W. Y. Chun in herb. sp. nov.

Ormosia xylocarpa W. Y. Chun ex Tanaka & Odashima, Jour. Soc. Trop. Agr. **10**: 369. 1938 (Contr. Hort. Inst. Taihoku Univ. **24**: 369), *nomen nudum*.

Arbor 12–20 m. alta, ramis glabris, ramulis dense subadpresse breviterque subcinereo-pubescentibus; foliis pinnatis, circiter 15 cm. longis, rhachi breviter pubescente, ultra jugum ultimum foliolorum 5–15 mm. producta; foliolis 5–7, coriaceis, oblongis, late oblongo-oblanceolatis, vel ellipticis, 4–8 cm. longis, 1.5–3 cm. latis, obtusis vel breviter acuminatis, basi late acutis vel subcuneatis, supra pallidis vel olivaceis, glabris, subtus pallidioribus, minute puberulis, vetustioribus glabrescentibus; nervis primariis utrinque circiter 8, gracilibus, subtus paullo

elevatis, curvatis, obscure arcuato-anastomosantibus, venulis arcte reticulatis, vix perspicuis; petiolulis 7 mm. longis, glabris vel pubescentibus, rugosis; inflorescentiis ut videtur depauperato-paniculatis, quam foliis brevioribus, terminalibus (sub fructu tantum visis), breviter pubescentibus; floribus ignotis; leguminibus compressis, ligneis, obovatis vel ellipticis vel oblongo-ellipticis, rariter inaequilateraliter obovatis, 5–7 cm. longis, 3–3.5 cm. latis, ad 1.5 cm. crassis, apiculato-acuminatis, basi crasse stipitatis, extus dense subadpresse breviter subferrugineo-pubescentibus; seminibus 1–5, ellipsoideis vel ovoideo-ellipsoideis, rubris, nitidis, duris, levibus, circiter 12 mm. longis, integumentis saepe distincte viscidis; hilo 2.5 mm. longo.

China: Hainan, Mo Shan Leng, *Chun & Tso 44382A* (type A, isotype N), Nov. 25, 1932, a forest tree 20 m. high, altitude about 600 m., *C. Wang 34477* (A, N), Oct. 4, 1933, *H. Y. Liang 63399, 63623, 63673* (A, N), October and November, 1933, *C. Wang 35703* (N), December, 1933; Kwangsi, Shap Man Taai Shan, *W. T. Tsang 24427* (A), Oct. 1–16, 1934, leaflets smaller than in the type, the fruits smaller and the seeds brownish red.

This is a characteristic species, distinguished by its thick, flattened, pubescent pods, the valves much thickened. The fully mature seeds are often distinctly viscid, a character we have otherwise observed only in the entirely different *Ormosia simplicifolia* Merr. & Chun. This viscid character may be associated with certain stages of development, for the seeds of some of the specimens, although nearly mature, are not at all viscid.

15. **Ormosia polysperma** Chen, sp. nov.

Arbor 8–18 m. alta, ramis teretibus, glabris vel brevissime pubescentibus, ramulis consperse vel dense breviter pubescentibus; foliis pinnatis, 21–25 cm. longis, rhachi breviter pubescente, ultra jugum ultimum foliolorum longe (1.5–3 cm.) producta; foliolis 5–7, oblongis vel oblongo-ellipticis, 8–15 cm. longis, 2.5–5 cm. latis, coriaceis vel subcoriaceis, rigidis, brevissime subobtuse acuminatis, basi late acutis, supra pallidis vel pallide olivaceis, glabris, subtus pallidioribus, conspersissime breviter pubescentibus; nervis primariis utrinque 10–12, haud perspicuis, subtus paullo elevatis, subpatulis, leviter curvatis, obscure arcuato-anastomosantibus, venulis subtus leviter elevatis, subconferte reticulatis; petiolulis breviter pubescentibus, rugosis, 8–11 mm. longis; inflorescentiis terminalibus, paniculatis, 8–14 cm. longis, plerumque e basi ramosis, ramis primariis 6–8 cm. longis vel inflorescentiis in axillis superioribus racemosis, dense breviter adpresse pubescentibus, pilis aliis pallide brunneis aliis subnitidis; bracteis bracteolisque brevibus, pubescentibus; pedicellis ad 8 mm. longis, crassis; floribus albidis, magnis, calycibus circiter 2.5 cm. diametro (apertis), lobis oblongo-ovatis, subacutis, ad 10 mm. longis et 6 mm. latis, extus densissime breviter pubescentibus, intus subpilosis; petalis omnibus circiter 2 cm. longis, vexillo suborbiculari-obovato, retuso, basi latissime acuto, unguiculo circiter 2.5 mm. longo; carinis alisque longe (4–5 mm.) unguiculatis, basi cuneatis, 8–10 mm. latis, alis rotundatis, glabris, carinis obscure subfalcatis, subacutis, sursum in marginibus exteri-oribus plus minusve pubescentibus; filamentis glabris, inaequalibus, 1.4–2.2 cm. longis, liberis; ovario sessili, oblongo-lanceolato, densissime pubescente, stylis sursum curvatis, glabris, deorsum plus minusve pubescentibus, circiter 1.5 cm. longis; ovulis 7–9; leguminibus 1- vel 2-spermis, compressis, oblique ovatis, et 3 cm. longis, vel polyspermis, subfalcato-oblongis, et 7 cm. longis, 3 cm. latis, valvis extus dense subadpresse subferrugineo-pubescentibus, rostratis, induratis; seminibus usque ad 9, oblongo-ellipsoideis, immaturis rubro-brunneis, levibus, nitidis, duris, ad 1 cm. longis et 6 mm. latis, hilo 1.5 mm. longo.

China: Kwangsi, Na I, Lin Yuin Hsien, *Steward & Cheo 545* (type A, isotype N), May 30, 1933, shrub, hillside-forest, flowers white; *Z. S. Chung 83379* (A); Kwangtung, Lung Tau Shan, Iu, *CCC 12506, 12643* (*To & Tsang*) (N), May 29, 1924; Yam Na Shan,

Mei District, *W. T. Tsang 21484, 21884* (N), Aug. 4–31, 1932; Hau T'ong Shan, Sin-fung District, *Y. W. Taam 880* (A), June 1–19, 1938; Sha Lo Shan, Sin-fung District, *Y. W. Taam 1040* (A), July 6–25, 1938; Kiangsi, Sai Hung Cheung, near Tung Tei Village, Kiennan District, *S. K. Lau 4343* (A), Sept. 1–11, 1934, rare, in forest; Tai Au Hong, *Gressitt 1610* (A), July 7, 1936.

This species is manifestly very closely allied to *Ormosia xylocarpa* Chun, the type of the latter being from Hainan, differing in its usually much larger leaflets. Unfortunately all of our Hainan material representing Chun's species is in fruit, while most of the Kwangsi, Kiangsi, and Kwangtung specimens which we place under *O. polysperma* Chen are in flower, none of the fruiting specimens having fully mature pods. It is entirely possible that future collections may show that it is undesirable to attempt to maintain two species here.

Series 10. Sericeolucidae

16. **Ormosia sericeolucida** Chen, sp. nov.

Arbor 24 m. alta, ramis ramulisque velutino-tomentellis; foliis pinnatis, 16–20 cm. longis, rhachi subcinereo-pubescente, ultra jugum ultimum foliolorum 5–10 mm. producta; foliolis 5–7, coriaceis, late oblongo-oblanceolatis vel oblongo-ellipticis, 8–11 cm. longis, 3–4.5 cm. latis, acutis vel leviter acuminatis, saepe brevissime mucronatis, basi acutis, margine subrevolutis, supra olivaceis, nitidis, glabris, costa valde impressa, subtus pallidis, densissime breviter subadpresse pubescentibus, indumento nitido; nervis primariis utrinque 10–12, supra obscuris, subtus distinctioribus, paullo elevatis, ad marginem arcuato-anastomosantibus, reticulationibus utrinque obsoletis vel subobsoletis; petiolulis 8–10 mm. longis, crassis, densissime breviter pubescentibus; inflorescentiis (sub fructu) paniculatis, terminalibus, breviter ramosis, densissime breviter pubescentibus; calycibus persistentibus circiter 1 cm. diametro, extus dense uniformiter pubescentibus; leguminibus immaturis stipitatis, compressis, oblongo-ellipticis vel obovatis, interdum plus minusve inaequilateralibus, 3–5 cm. longis, 2.2 cm. latis, apice rotundatis vel inaequilateraliter brevissime late acuminatis, extus densissime breviter subochraceo-pubescentibus, valvis crustaceo-coriaceis, vix 1 mm. crassis; seminibus solitariis vel binis, valde immaturis brunneis, compressis, duris, irregulariter obovatis vel oblongo-obovatis, saltem 1 cm. longis (maturis ignotis), hilo minuto.

China: Kwangsi, Seh-feng Dar Shan, south of Nanning, *R. C. Ching 7931* (type A, isotype U), Oct. 16, 1928, a rare tree 24 m. high in forests, altitude about 360 m.

This species is distinguished by the pale brownish, very dense, and often shining pubescence on the lower surface of the leaflets, the panicles, and the fruits. It is suspected that the mature seeds will prove to be red and considerably larger than indicated in this description, based on the very immature ones at present available.

Series 11. Layia

(*Layia* Hook. & Arn., as a genus; subsect. *Layia* of Sect. *Ormosia* proper Prain, of the subgenus *Toulichiba*)

17. **Ormosia emarginata** (Hook. & Arn.) Benth. Hook. Jour. Bot. Kew Gard. Miscel. **4**: 77. 1852; Benth. Fl. Hongk. 96. 1861; Forbes & Hemsl. Jour. Linn. Soc. Bot. **23**: 204. 1890; Prain, Jour. As. Soc. Bengal **69**(2): 180. 1900 (Bot. Not. Pap. 390. 1901); Dunn & Tutch. Kew Bull. Add. Ser. **10**: 88. 1912; Chun, Sci. Jour. Col. Sci. Sunyatsen Univ. **2**(3): 48. 1930; Merr. Lingnan Sci. Jour. **14**: 12. 1935.

Layia emarginata Hook. & Arn. Bot. Beechey Voy. 183. *t. 38*. 1833.

Macrotropis emarginata Walp. Rep. **2**: 903. 1843.

Ormosia glaberrima Wu, Bot. Jahrb. **71**: 182. 1940.

China: Hongkong (and Hongkong New Territory), *C. Wright s.n.* (G, N, U), *Ford. s.n.* (A), *Hance 705* (G), *Hongkong Herb. 7496* (A), *11223* (N), *W. Y. Chun 6006, 6900* (A, N), *Y. Tsiang 35* (A); Hainan, Yeung Lam Shan, Yai-hsien District, *S. K. Lau 226, 6135* (A), July 1932 and May, 1935; Po-ting, *F. C. How 72920* (A), June 16, 1935; also Kwangtung and Kwangsi, fide Wu. Indo-China: Tonkin, Sai Wong Mo Shan (Sai Vong Mo Leng), Dam-ha, immediately south of the juncture of the Kwangtung-Kwangsi-Tonkin boundaries, *W. T. Tsang 30082, 30185* (A), May–Sept., 1940, in flower and with immature fruits.

This species is strongly characterized by its small flowers, most parts being glabrous except the cinereous-pubescent inner parts of the calyces, the calyces being characteristically black when dry in sharp contrast to the pale petals. The leaflets are always retuse and vary in number from 3 to 7, being mostly 5 to 7. The small, hard, smooth, shining, scarlet, ovoid to ellipsoid seeds are up to 1 cm. long and the hilum is about 2 mm. long. *Ormosia glaberrima* Wu, Bot. Jahrb. **71**: 182. 1940, was based on three collections from Kwangsi and Kwangtung, *Sin 5224, 21512, 22390*, and regarding it Wu says: "Species habitu toto glaberrimo, necnon leguminibus *O. emarginatae* Benth. affinis, sed ab ea foliolis floribusque diversa." We have seen none of the cited specimens, but from a critical study of the detailed description we are not able to separate this from *Ormosia emarginata* Benth., a species represented in our herbarium by ample material in various stages of development. We suspect that the form Wu had is actually represented by *Tsang 30082* and *30185* from the extreme northeastern limits of Tonkin, just below the juncture of the Kwangsi-Kwangtung-Tonkin boundaries.

18. **Ormosia kwangsiensis** Chen, sp. nov.

Frutex vel arbor parva, ramis glabris, ramulis ultimis glabris vel obscure pubescentibus; foliis pinnatis, 15–19 cm. longis, rhachi glabra, ultra jugum ultimum foliolorum haud vel ad 1 cm. producta; foliolis vulgo 7, subcoriaceis, glaberrimis, oblongis, in sicco supra brunneo-olivaceis, nitidis, subtus brunneis, breviter subobtuse acuminatis, basi late acutis vel rotundatis, 7–9 cm. longis, 2.5–3 cm. latis; nervis primariis utrinque 8 vel 9, gracilibus, subtus leviter elevatis, obscure arcuato-anastomosantibus, reticulationibus sublaxis; petiolulis rugosis, glabris, castaneis vel glaucis, 7 mm. longis; paniculis (sub fructu) obscurissime castaneo-hirsutis glabrescentibus, floribus ignotis; leguminibus compressis, haud stipitatis vel brevissime stipitatis, apice breviter acuminatis, oblongo-obovoideis vel oblongo-ellipticis, glabris, compressis, maturis atris, utrinque late acutis, 3.3–4.5 cm. longis, 2 cm. latis, valvis subnitidis, crustaceo-coriaceis vel sublignosis, ca. 1 mm. crassis; seminibus 1 vel 2, ellipticis, rubris, duris, nitidis, compressis, circiter 1 cm. longis, hilo elliptico, 1 mm. longo.

China: Kwangsi, Shap Man Taai Shan, Tang Lung village, southeast of Shangsze, Shangsze District on the Kwangtung border, *W. T. Tsang 24147* (type A, NA, N), Aug. 30, 1934, fairly common in thickets; Seh-feng Dar Shan, south of Nanning, *R. C. Ching 8301* (N), Oct. 28, 1938.

In vegetative characters this species somewhat suggests *Ormosia semicastrata* Hance, but, because of its very differently shaped and much longer 1- and 2-seeded pods, it clearly does not belong in the alliance of that species; when the flowers are known it will probably be found to have ten stamens rather than five as Hance's species. This is another of the several species that discredits the rachis character as a dependable one by which subdivisions such as *Chacnolobium* and *Ormosia* proper may be distinguished. In the type collection, the rachises of some leaves are not at all produced, while in others they are up to 8 mm. in length above the insertion of the upper pair of leaflets; in *Ching 8301* they are all produced about 1 cm.

19. **Ormosia Henryi** Prain, Jour. As. Soc. Beng. **69**(2): 180. 1900 (Bot. Not. Pap. 310. 1901); Craib in Sargent, Pl. Wils. **2**: 93. 1914; Gagnep. in Lecomte, Fl. Gén. Indo-Chine **2**: 511. 1920; Hu, Contr. Biol. Lab. Sci. Soc. China **2**(5): 9. 1926; Chun, Sci. Jour. Coll. Sci. Sunyatsen Univ. **2**(3): 46. 1930; Merr. & Chun, Sunyatsenia **1**: 60. 1930; Hand.-Maz. Beih. Bot. Centralbl. **52B**: 157. 1934.

Ormosia Henryi Hemsl. & Wils. Kew Bull. **1906**: 156. 1906; Chun, Chinese Econ. Trees 187. 1922.

Ormosia mollis Dunn, Jour. Bot. **47**: 198. 1909; Dunn & Tutch. Kew Bull. Add. Ser. **10**: 88. 1912.

CHINA: Chekiang, *R. C. Ching 1709, 2482* (A, U), *2214* (A, N, U); *Y. L. Keng 320* (A); Anhwei, *R. C. Ching 3188* (A); Fukien, *H. H. Chung 967* (A), *6817* (A, L), *7829* (A, N, L); *Metcalf 7438* (A); Kwangtung, *CCC (Levine) 3456* (A, G), *1112* (A, G, N, U, L); *CCC 14265 (Tsang & Wang)* (L); *Y. Tsiang 3323* (N); *N. K. Chun 40347* (N); *Y. F. Chun 30384* (N); Kwangsi, *R. C. Ching 5279* (A, N, U); *W. T. Tsang 27965* (A); *Z. S. Chung 83405* (A); Kweichow, *Y. Tsiang 7754* (A, N); Hunan, *Handel-Mazzetti 11482 (482 = 2291)* (A); Hupeh, *Henry 7577* (ISOTYPE G, U); *Wilson 2373* (A, G, U); *H. C. Chow 1878* (A, N); Kiangsi, *H. H. Hu 1298* (A); *Y. Tsiang 10229, 10276* (N); *S. K. Lau 3968* (A). Also Tonkin, *fide* Gagnepain.

Prain's description of this species, based on *Henry 7577*, has six years' priority over the identical binomial published by Hemsley & Wilson in 1906, the latter also based in part on the same collection. Dunn, in describing *O. mollis* in 1909, based this in part on *Ford 60*, which Hemsley & Wilson cited as representing *O. Henryi* Hemsl. & Wils. There is no doubt as to the specific identity of the three independently described species, a fact that Merrill and Chun have already noted.

Ormosia Henryi Prain is marked by the tawny to pale, soft indumentum of the branches, branchlets, the lower surface of the leaflets, the petioles, the inflorescences, and the flower-buds. The leaflets are large, elliptic to oblong or lanceolate, and firmly coriaceous. The strongly compressed pods are glabrous or nearly so and vary a great deal in size and in the number of seeds. In pods on one Kwangsi specimen the seeds vary from one to seven; one Hupeh specimen that we refer here has as many as ten seeds, its pods being up to 12 cm. long and 3.5 cm. wide. In the other fruiting specimens cited the pods are smaller, varying from 4 to 9 cm. long and 2 to 2.5 cm. wide, but in these the seeds vary in number from one to as many as nine, one- or few- to many-seeded pods occurring on the same specimen. The hard, red, shiny, smooth seeds are mostly 9–12 mm. long (8–15 mm. according to Hemsley & Wilson), and the hilum is 2.5–3 mm. in length.

20. **Ormosia formosana** Kaneh. Bot. Mag. Tokyo **30**: 420. 1916, Formos. Trees 205. *1 f.* 1917, ed. 2. 205. *1 f.* 1918, ed. 3. 305. *f. 260.* 1936; Hayata, Ic. Pl. Formos. **10**: 5. 1921; Yamamoto, Suppl. Ic. Pl. Formos. **2**: 26. *f. 16.* 1926.

FORMOSA: Nanto, *Wilson 9994* (A); Rengachi, *Hayashi 306, 21255* (A); Baran, *Kudo* (A).

The red hard shining seeds are about 1 cm. long, the hilum 2 mm. in length. The rachis is produced 5 to 15 mm. above the point of insertion of the upper pair of leaflets. On the cited specimens the leaflets vary from 3 to 5, but Kanehira states that they vary from 5 to 9. Yamamoto thought that the species was very close to *Ormosia Fordiana* Oliv., but the two are not related. *Ormosia formosana* is the only representative of the genus recorded from Formosa and is confined to that island.

21. **Ormosia microphylla** Merrill in herb. sp. nov.

Frutex circiter 3 m. altus, ramis teretibus, glabris vel subglabris, ramulis dense breviter subferrugineo-pubescentibus; foliis pinnatis, 12–16 cm. longis, rhachi

tenui, pilosa, ultra jugum ultimum foliolorum 5–7 mm. producta; foliolis plerumque 15, chartaceis, oblongis, 2–4 cm. longis, 1–1.5 cm. latis, acutis vel breviter acuminatis, basi rotundatis, supra olivaceis, glabris vel subglabris, subtus pallidis, plus minusve adpresse breviter pubescentibus; nervis primariis utrinque 5–7, gracilibus, subtus elevatis, distinctis, curvatis, ad marginem obscure curvato-anastomosantibus, reticulis gracilibus; inflorescentiis terminalibus (floribus ignotis); leguminibus stipitatis, subrhomboideis vel oblongis, 5–6 cm. longis, 2–3 cm. latis, compressis, breviter apiculatis, glabris, lucidis, in sicco atro-brunneis vel atris, valvis crasse coriaceis vel lignosis; seminibus 3 vel 4 (submaturis), brunneis, duris, subnitidis, 1.2 cm. longis, 0.6–0.8 mm. latis, hilo 3–3.5 mm. longo.

China: Kwangsi, Shap Man Taai Shan, near Hok Lung village, southeast of Shangsze, Shangsze District, near the Kwangtung border, *W. T. Tsang 22423* (type A), June 4, 1933, a shrub, fairly common in thickets; local name *so tau muk shue*.

The striking character of this species is its unusually small, numerous leaflets.

22. **Ormosia olivacea** Chen, sp. nov.

Arbor circiter 20 m. alta, ramis (8 mm. crassis) consperse subhirsutis, glabrescentibus, alabastris axillaribus densissime subferrugineo-pubescentibus; foliis pinnatis, circiter 45 cm. longis, petiolo et rhachi perspicue pubescentibus, rhachi ultra jugum ultimum foliolorum brevissime (2 mm.) producta; foliolis 17, oblongis, chartaceis vel membranaceo-subchartaceis, 12–15 cm. longis, 4–5 cm. latis, subacutis, obtusis, vel breviter obtuse acuminatis, basi rotundatis, supra glabris vel subglabris, levibus, costa valde impressa, subtus pallidioribus, consperse subpilosis; nervis primariis utrinque 6–8, subtus elevatis, perspicuis, curvatis, arcuato-anastomosantibus, supra plus minusve obscuris; petiolulis 4–5 mm. longis, crassis, subdense pubescentibus; inflorescentiis ignotis; leguminibus compressis, oblongis, glabris, circiter 7 cm. longis, 2.5 cm. latis, valvis coriaceis, circiter 1 mm. crassis, vetustioribus nigris; seminibus ad 4, obovoideis vel subreniformibus, circiter 9 mm. longis et 10 mm. latis, leviter compressis, duris, rubris, levibus, nitidis, hilo circiter 3 mm. longo.

China: Yunnan, Fo-Hai, *C. W. Wang 77291* (type A), July, 1936, a large tree in forests, about 20 m. high, the trunk 1 m. in diameter.

Of this we have a portion of a branch with one attached leaf and several pods or parts of pods apparently picked up from the ground under the tree; these fruits are very old, the valves having commenced to disintegrate. The species has no very close allies among the described forms and is characterized by its unusually long leaves and its large thin leaflets. The seeds are characteristically somewhat wider than long.

Series 12. Amacrotropis

(*Macrotropis* § *Amacrotropis* Miq. = subsect. *Amacrotropis* Prain of Sect. *Ormosia* proper Prain)

23. **Ormosia yunnanensis** Prain, Jour. As. Soc. Beng. **69**(2): 183. 1900 (Bot. Notes Pap. 393. 1901), **73**(2): 46. 1904; Craib, Fl. Siam. Enum. **1**: 497. 1928; Chun in Sci. Jour. Coll. Sci. Sun Yatsen Univ. 2(3): 45. 1930.

Ormosia microsperma sensu Chun, Sci. Jour. Sun Yatsen Univ. 2(3): 45. 1930, non Baker.

China: Yunnan, *Henry 11967*, isotype (A, N), *12885* (A, N, U), *C. W. Wang 75758, 71801, 78944* (A), *M. K. Li 1669* (A). Also Siam, *fide* Craib.

The type of *Ormosia microsperma* Baker was from Malacca. Chinese material so named which we have seen represents *O. yunnanensis* Prain. We think it certain that erroneously named material was the basis of Chun's record of the occurrence of Baker's species in Kwangtung. We have seen no Chinese material that conforms to the characters of *Ormosia microsperma* Baker and no

Kwangtung material that represents *Ormosia yunnanensis* Prain. The latter is characterized by its pyriform to suborbicular or ovate pods (if with but a single seed), or oblong pods (if with two seeds), which are glabrous except at the base and along one suture, and black when mature. The very hard, smooth, shining, bright red seeds are 8–10 mm. long, the hilum about 2 mm. in length. The leaflets are lanceolate, with short acute apices and rounded bases, and are conspicuously pubescent on the lower surface. This species was placed by Prain in his subsection *Amacrotropis* of *Ormosia* proper.

Series 13. Semicastratae

24. **Ormosia semicastrata** Hance, Jour. Bot. **20**: 78. 1882; Forbes & Hemsl. Jour. Linn. Soc. Bot. **23**: 204. 1887; Prain, Jour. As. Soc. Bengal **69**(2): 180. 1900 (Bot. Notes Pap. 390. 1901); Dunn & Tutch. Kew Bull. Add. Ser. **10**: 88. 1912; Merr. Lingnan Sci. Jour. **5**: 91. 1928; Chun, Sci. Jour. Col. Sci. Sun Yatsen Univ. **2**(3): 50. 1930.

China: Hongkong, Happy Valley, *Ford s.n.* (G,[1] N, photo. of holotype, A); Kwangtung, Hueng Lok Leuk, *CCC 13270 (McClure)* (A, L); Ting Wu Shan, *W. Y. Chun 6478* (A), *Y. Tsiang 755* (A); Sha Po Shan, *Y. W. Taam 212* (A); Ying-tak, *K. K. Wang 2900* (A, N), *H. T. Ho 60020* (N); Hainan, Five Finger Mountains, Yaichow, Dung Ka, and Lokwui, *CCC 9809 (McClure)* (A, N), *F. C. How 70309* (A, N), *F. C. How & N. K. Chun 70150* (A, N), *C. Wang 33625* (A, N), *33434, 35899* (N), *H. Y. Liang 62010, 64198, 65101* (N), *62561, 63111, 63487, 64382* (A, N), *S. K. Lau 28379* (A, N), *Chun & Tso 43490* (A, N); Kwangsi, Yung Hsien, *Steward & Cheo 835* (A, N).

This species is strongly differentiated by having but five fertile stamens and by its small, strictly 1-seeded fruits, among other characters. On its stamen characters alone it might be taken out of *Ormosia* as representing a distinct genus, but in its vegetative, pod, and seed characters it, like the other species placed in this series, is an *Ormosia* in all respects. The cited specimens show considerable variation in vegetative characters and some in indumentum. The Hongkong form, as represented by our material and as described by Hance, has but 3 or 5 leaflets and the rachis is produced 1.5 to 2.4 cm. above the point of insertion of the upper pair of leaflets. In the Kwangtung, Kwangsi, and Hainan material the leaflets are mostly 7 to 9, and the leaf-rachis above the point of insertion of the upper pair of leaflets is much shorter, usually not more than 1 cm. in length, frequently only a few mm., and occasionaly not produced at all. The hard smooth shining red seeds are 8–9 mm. in diameter, usually slightly wider than long, as is true of the seeds of the other species we have placed in this series. The small hilum is about 1.5 mm. long. While Hance correctly noted the five fertile stamens, he did not mention that the flowers, even those of his type collection, also have from two to four slender staminodes or sterile filaments 1 to 2 mm. in length.

25. **Ormosia apiculata** Chen, sp. nov.

Arbor circiter 19 m. alta, inflorescentiis (sub fructu) leviter pubescentibus exceptis glabra (floribus ignotis), ramis ramulisque teretibus; foliis pinnatis, 14–19 cm. longis, rhachi glabra, ultra jugum ultimum foliolorum longe (2–2.5 cm.) producta; foliolis 3–5, subcoriaceis, oblongis vel late oblongo-lanceolatis, 8–13 cm. longis, 2.5–3.5 cm. latis, utrinque subaequaliter angustatis, apice gradatim obscure acuminatis (acuminibus obtusis vel obscure emarginatis), basi acutis, supra pallide olivaceis, subopacis, subtus pallidioribus, costa supra impressa, subtus valde elevata; nervis primariis utrinque circiter 10, supra obscuris, subtus leviter elevatis, gracilibus, arcuato-anastomosantibus, reticulis leviter elevatis;

[1] This is an isotype, being labelled "Happy Valley woods, April, 1879," distributed as "*Ormosia* ? sp nov."

petiolulis 5–7 mm. longis, rugosis; paniculis terminalibus, sub fructu ad 20 cm. longis, e basi ramosis, ramis paucis, 5–15 cm. longis, partibus junioribus plus minusve subadpresse pubescentibus; leguminibus distincte stipitatis (stipite 2.5–4.5 mm. longo), late orbicularibus vel plerumque latioribus quam longis, 1.5 cm. longis, ad 2 cm. latis, compressis, glabris vel conspersissime breviter adpresse pubescentibus, basi late truncato-rotundatis, apice late rotundatis, abrupte graciliter apiculatis, apiculo 4–6 mm. longo, curvato, acuminato, valvis coriaceis, haud 1 mm. crassis; seminibus solitariis, immaturis compressis, rubris, duris, 10 mm. longis, hilo vix 1 mm. longo.

CHINA: Kwangsi, Yeo Mar Shan, north of Hin Yen, *R. C. Ching 7183* (TYPE A, isotype N), August 27, 1928, a rare tree in forests, alt. about 1650 m.

Although the flowers of this species are unknown, we place it with confidence in the group with *Ormosia semicastrata* Hance, because of its small, compressed, strictly 1-seeded pods, these (not fully mature) being much more compressed than in Hance's species, somewhat inequilateral, wider than long, and with a prominent curved apiculus 4 to 6 mm. in length.

26. **Ormosia cathayensis** Chen, sp. nov.

Arbor parva, 9–10 m. alta, ramis ramulisque glabris; foliis pinnatis, 15–21 cm. longis, rhachi breviter pubescente, ultra jugum ultimum foliolorum 1.2–2 cm. producta; foliolis 3–5, subcoriaceis, oblongis vel late oblongo-lanceolatis vel oblongo-ellipticis, 6–13 cm. longis, 3–4.5 cm. latis, plerumque distincte sed obtuse acuminatis (acuminibus plerumque minute emarginatis), raro obtusis, basi late acutis vel subrotundatis, supra olivaceis, glabris, costa valde impressa, subtus pallide brunneis, glabris vel secus costam sparsissime pubescentibus; nervis primariis utrinque circiter 10, gracilibus, subtus leviter elevatis, venulis arcte reticulatis; petiolulis rugosis, 6–10 mm. longis, obscure breviter pubescentibus; inflorescentiis (sub fructu) terminalibus, paniculatis, 11–15 cm. longis, ramis primariis paucis, ad 6 cm. longis, dense breviter subferrugineo-pubescentibus; calycibus persistentibus circiter 3 mm. longis, extus adpresse pubescentibus; floribus ignotis; leguminibus distincte inaequilateralibus, inflatis, circiter 1.5 cm. longis et 1 cm. latis, breviter stipitatis, basi subrotundatis, apice breviter (1–2 mm.) apiculatis, valvis coriaceis, atris, praesertim basi margineque plus minusve consperse pilosis glabrescentibus; seminibus solitariis, duris, levibus, rubris, nitidis, suborbicularibus vel obscure late obovatis, circiter 9 mm. longis, hilo 1 mm. longo.

CHINA: Kwangtung, Kwai Shan, Tsing-lo-kong village, Ho-yuen District, *W. T. Tsang 28518* (A TYPE), March 16–31, 1938, a fairly common tree in forests; Lung Tau Mountain, near Iu, *CCC 12257* (*To, Tsang & Tsang*) (U), May 29, 1924.

This species we also place with confidence in the group with *Ormosia semicastrata* Hance, although its flowers are unknown. It differs particularly in its distinctly inequilateral pods. A Kiangsi specimen, *Lau 3988* (A), is very similar to this, but its immature pods are strongly compressed, more equilateral, and very shortly apiculate.

27. **Ormosia Howii** Merrill & Chun in herb. sp. nov.

Arbor circiter 10 m. alta, ramis glabris, ramulis ultimis dense breviter pubescentibus, teretibus vel subangulatis; foliis pinnatis, 16–22 cm. longis, petiolo glabro vel breviter pubescente, rhachi ultra jugum ultimum foliolorum 3–8 mm. producta leviter pubescente; foliolis 5–7, crasse coriaceis, oblongo-ellipticis vel anguste oblongo-obovatis, 6–14 cm. longis, 2–4 cm. latis, obtusis vel obtuse acuminatis (acuminibus plerumque minute retusis), basi acutis vel subrotundatis, supra pallide viridibus, glabris, subnitidis, subtus pallidis vel pallide brunneis, glabris vel ad costam leviter pubescentibus, nervis primariis utrinque circiter 10,

supra subdistinctis, leviter impressis, subtus distinctioribus, leviter elevatis, arcuato-anastomosantibus, reticulationibus primariis distinctis, ultimis subdensis, omnibus leviter elevatis; petiolulis breviter pubescentibus, 5–8 mm. longis; paniculis terminalibus, sub fructu 15 cm. longis, dense subcinereo-pubescentibus vel ramulis ultimis ferrugineo-pubescentibus, ramis primariis ad 10 cm. longis; leguminibus 1-spermis, inaequilateraliter elliptico-ovatis vel ovato-rhomboideis, basi subinaequilateraliter rotundatis compressis, 2 cm. longis, 1.5–1.8 cm. latis, breviter stipitatis, valvis subabrupte acuminatis acuminibus 3–4 mm. longis, crasse coriaceis vel sublignosis, glabris vel (praesertim secus basim marginemque) conspersissime pilosis; seminibus leviter compressis, duris, nitidis, levibus, coccineis, suborbicularibus, circiter 8 mm. longis et 9 mm. latis; calycibus persistentibus ferrugineo-pubescentibus, circiter 4 mm. longis.

CHINA: Hainan, Po-ting, *F. C. How 72892, 73646* (TYPE A), June 14 and September 7, 1935, in forests, altitude 500 to 900 m.

This seems clearly to be very closely allied to *Ormosia semicastrata* Hance, but it differs so much in its vegetative and fruit characters that it seems desirable to recognize it, at least for the present, as a distinct species.

28. **Ormosia nanningensis** Chen, sp. nov.

Arbor 20 m. alta, ramulis glabris; foliis pinnatis, 13–20 cm. longis, rhachi glabra ultra jugum ultimum foliolorum circiter 1.5 cm. producta; foliolis plerumque 5, subcoriaceis, 7.5–11 cm. longis, 2.5–3.5 cm. latis, oblongis vel late oblongo-oblanceolatis, obtuse acuminatis, apice interdum minute emarginatis, basi late acutis, utrinque glaberrimis, supra subolivaceis, nitidis, subtus paullo pallidioribus; nervis primariis utrinsecus circiter 9, gracilibus, utrinque leviter elevatis, subdistinctis, distincte arcuato-anastomosantibus, reticulationibus sublaxis; petiolulis gracilibus, 8–10 mm. longis; inflorescentiis (sub fructu) circiter 15 cm. longis, griseo-pubescentibus, pedicellis 5 mm. longis, floribus ignotis; leguminibus compressis, ovatis, subaequilateralibus, 2 cm. longis, 1.8 cm. latis, breviter acuminatis, extus subdense breviter subgriseo-pubescentibus, monospermis, valvis coriaceis, haud 1 mm. crassis; seminibus solitariis, late subobovoideis, circiter 10 mm. longis et 9 mm. latis, leviter compressis, duris, nitidis, rubris, levibus; hilo circiter 3 mm. longo.

CHINA: Kwangsi, Seh-feng Far Shan, south of Nanning, *R. C. Ching 8300* (TYPE N, isotype L, frustulum A), Oct. 28, 1928, a rare tree in open woods, alt. about 650 m.

Although the flowers of this species are unknown, and although it differs from the others we have placed in the series *Semicastratae* particularly in its uniformly pubescent pods (those of the other species being glabrous or nearly so), we think that this species is correctly placed.

Series 14. HOSIEAE

29. **Ormosia Hosiei** Hemsl. & Wils. Kew Bull. **1906:** 156. 1906; Craib in Sargent, Pl. Wils. **2:** 94. 1914; Chun, Chinese Econ. Trees 187. 1922, Sci. Jour. Col. Sci. Sun Yatsen Univ. **2**(3): 45. 1930.

Ormosia Taiana Chiao, Sinensia **3:** 349. 1933.

CHINA: Hupeh, Nanto, *Wilson 808* (A, N), *1944* (K, syntype); Szechuan, Chengtu, *Wilson 3407* (A), *2372* (A, G, N), *S. S. Chien 5001* (A); Shensi, *H. W. Kung 3297* (A); Kiangsu, *F. L. Tai 1* (A, N), isotype of *Ormosia Taiana* Chiao.

This species seems to be a reasonably uniform one, and among all but one other Chinese species it is distinguished by its long hilum, which is 7 mm. in length; in all of the other Chinese species (except *O. Balansae* Drake) the hilum is 1 to 3 or at most 3.5 mm. in length. The only Old World species known to us with a longer hilum is the entirely different *Ormosia Balansae* Drake, in which the hilum is about 15 mm. long and extends halfway around the seed.

The tree is apparently not uncommon in cultivation; in fact the majority of the specimens cited above were taken from planted trees. The timber is highly valued in China, the tree being known as *hung tau shu* (red bean tree); see Wilson's note in Sargent, Pl. Wils. 2: 94. 1914. This species grows farther north in China than do any of the other known species of the genus. It is clearly not native of Kiangsu, as the cited specimen from that province was taken from a planted tree; the same statement is probably true as to the Shensi record, as the cited specimen was taken from a tree in temple grounds.

Series 15. Balansae

30. **Ormosia Balansae** Drake, Jour. de Bot. **5**: 215. 1891; Prain, Jour. As. Soc. Bengal **69**(2): 182. 1900 (Bot. Not. Pap. 392. 1901); Gagnep. in Lecomte, Fl. Gén. Indo-Chine **2**: 512. 1920.

Ormosia elliptilimba Merr. & Chun, Sunyatsenia **2**: 31. *t. 13.* 1934.

Indo-China: Tonkin, Tu-Phap, *Balansa 2178*, fragment of the type (A); Phu-Ho, *Pételot 3055, col. Du Pasquier* (A, N); Ho Yung Shan and Sai Wong Mo Shan (Sai Vong Mo Leng), south of the juncture of the Kwangsi-Kwangtung-Tonkin boundaries, *W. T. Tsang 30261, 30686* (A), July–November, 1940. China: Kwangsi, Sup-man-ta Shan, *H. Y. Liang 69829* (A); Hainan, Po-ting, Lingshui, Dung-Ka, Wen Fa Shi, and Yaochow, *S. P. Ko 52184* (A, N), type and isotype of *Ormosia elliptilimba* Merr. & Chun, *N. K. Chun & C. L. Tso 43772, 44286* (A, N), *C. Wang 33316, 33327* (A, N), *H. Y. Liang 62303, 64188* (N), *62302, 63773* (A, N), *F. C. Howe 72935, 73170, 73366* (A), *S. K. Lau 28015* (A).

This is one of the most strongly marked species in the genus and is easily distinguished from all other described forms by its very long and conspicuous hilum. The densely pubescent pods are mostly 1-seeded, sometimes 2-seeded, compressed, ovoid to suborbicular, tardily dehiscent (perhaps even indehiscent), the crustaceous valves being rather fragile. The shining red seeds are up to 14 mm. long, the very prominent hilum varying from 12 to 15 mm. in length; in this one character the species approaches the Brazilian *Macroule Coutinhoi* (Ducke) Pierce (*Ormosia Coutinhoi* Ducke). As noted under *Ormosia Hosiei* Hemsl. & Wils., all other Old World species known to us have a small hilum, 1 to 3 or at most 3.5 mm. long, except these two otherwise not at all closely allied ones. Merrill and Chun noted that their *Ormosia elliptilimba* was allied to *O. Balansae* Drake, listing minor differences; with access to type material and additional collections we find no possible way of distinguishing two species here, and so reduce *Ormosia elliptilimba* Merr. & Chun to synonymy.

Species of which the fruits are as yet unknown and which cannot now be placed in any proposed subdivision of the genus

31. **Ormosia euphorioides** Pierre ex Gagnep. Not. Syst. **3**: 30. 1914, et in Lecomte, Fl. Gén. Indo-Chine **2**: 508. *f. 49, 1–5.* 1920.

Indo-China: Cochinchina, Bien-hoa Province, Chiao-xhan Mountain, *Pierre 6041* (P, fragm. A).

Known only from the type collection; the fruit is unknown.

32. **Ormosia hoaensis** Pierre ex Gagnep. Not. Syst. **3**: 32. 1914, et in Lecomte, Fl. Gén. Indo-Chine **2**: 510. 1920.

Indo-China: Cochinchina, Bien-hoa Province, Cai River, *Pierre 6041 bis* (A, U).

This species is known only from the type collection. The specimens we have seen are of the Pierre collection, but unnumbered, both sheets from the Cai River, Bien-hoa Province, and both named by Gagnepain. He described the leaflets as 6–12 cm. long and 2.5–4 cm. wide; the largest leaflets on the sheets we have examined are 10–14 cm. long and 3.5–6 cm. wide. The fruits are unknown.

33. **Ormosia tonkinensis** Gagnep. Not. Syst. **3**: 200. 1914, et in Lecomte, Fl. Gén. Indo-Chine **2**: 510. *f. 49, 7–12.* 1920.

INDO-CHINA: Tonkin, Mount Bavi, near Sougi village, *Balansa 2253* (fragm. A).

Known only from the type collection, the fruits unknown.

34. **Ormosia Tsangii** Chen, sp. nov.

Frutex vel arbor parva, ramis teretibus, glabris, ramulis gracilibus, breviter adpresse pubescentibus; foliis pinnatis, 12–15 cm. longis, rhachi obscure pubescente glabrescente ultra jugum ultimum foliolorum ad 1 cm. vel haud producta; foliolis 5–7, subcoriaceis, supra pallide viridibus vel brunneo-olivaceis, opacis, glabris, subtus consperse adpresse brevissime pubescentibus glabrescentibus, oblongo-ellipticis, 6–8 cm. longis, 2–3.5 cm. latis, breviter acuminatis, basi acutis, costa supra subimpressa, subtus valde elevata; nervis primariis utrinque circiter 8, supra obscuris, subtus gracilibus, haud perspicuis, leviter elevatis, obscure arcuato-anastomosantibus, reticulis primariis sublaxis; petiolulis gracilibus, rugosis, obscure pubescentibus vel glabris, 6–8 mm. longis; inflorescentiis terminalibus et in axillis superioribus, sub fructu valde immaturo paniculatis, ad 9 cm. longis, ramis primariis paucis, breviter adpresse pubescentibus, pedicellis 6–8 mm. longis; floribus ignotis; calycibus persistentibus subcoriaceis, lobis ovatis, 4 mm. longis, 3 mm. latis, utrinque pubescentibus, acutis vel obtusis; ovario dense pubescente, stipitato; leguminibus valde immaturis (seminibus vix efformatis) inflatis, oblongo-ovoideis, extus breviter dense subadpresse pubescentibus, valvis crustaceo-coriaceis, haud 1 mm. crassis, 1.5–2 cm. longis, ad 1 cm. latis; seminibus valde immaturis 1–3, ut videtur levibus, nitidis, duris (maturis rubris ?).

INDO-CHINA: Tonkin, Sai Wong Mo Shan (Sai Vong Mo Leng), near the juncture of the Tonkin-Kwangsi-Kwangtung borders, *W. T. Tsang 30276* (TYPE A), July 18–Sept. 9, 1940.

The fruits are not sufficiently developed to make a complete description feasible, although it is clear that the species represented is different from all hitherto described ones of the genus. We are, however, unable to indicate its proper place in any proposed scheme of classification. It is one of the several species that tends to invalidate *Chaenolobium,* in that on the same branch one notes leaves with the rachis produced and not produced above the insertion of the upper pair of leaflets.

DOUBTFUL AND EXCLUDED SPECIES

ORMOSIA ESQUIROLII Lév. Fl. Kouy-Tchéou 240. 1915, type from Kweichow Province, China = *Sophora japonica* Linn.; see Rehder, Jour. Arnold Arb. **13**: 322. 1932.

ANAGYRIS FOETIDA Lour. Fl. Cochinch. 260. 1790.

Macrotropis foetida DC. Prodr. **2**: 99. 1790.

Anagyris chinensis Spreng. Syst. **2**: 346. 1825.

Anagyris sinensis Steud. Nomencl. ed. 2, **1**: 83. 1840.

This is *Sophora japonica* Linn.; see Merrill, Trans. Am. Philos. Soc. II. **24**(2): 194. 1935. Loureiro's type, which is not extant, was from southern China.

ANAGYRIS INODORA Lour. Fl. Cochinch. 260. 1790.

Macrotropis inodora DC. Prodr. **2**: 99. 1825.

Loureiro's type was from Cochinchina and no authentic specimen is extant. Merrill, op. cit. 194, thought that possibly a species of *Sophora* was represented, but if so Loureiro's description of the fruits must be eliminated. Its Annamese name, as listed by Loureiro, is that of *Sophora japonica* Linn.

List of cited specimens

All specific names pertain to *Ormosia*.

Balansa 2178 Balansae; 2253 tonkinensis.
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Chow 1878 Henryi.
Chun, N. K. 40347 Henryi.
Chun, N. K. & Tso 43490 semicastrata; 43544, 43848, 44088 pinnata; 43772, 44286 Balansae; 44382 xylocarpa.
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Kung 3297 Hosiei.
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McClure 7718 pinnata; 8132, 9756 Fordiana; 9809, 13270 semicastrata.
Metcalf 7438 Henryi.
Pételot 3055 Balansae.
Pierre 6041 euphorioides; 6041 bis hoaensis; s.n. cambodiana.
Stewart & Cheo 545 polysperma; 835 semicastrata.
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Tai 1 Hosiei.
Tang 443 pinnata.
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To & Fuson 2664 pinnata.
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Tsang & Fung 17859, 18027 Fordiana.

Tsang & Wang 14265 Henryi.
Tsiang 35 emarginata; 755 semicastrata; 791, 1539 Fordiana; 3323, 7754, 10229, 10276 Henryi.
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Ts'oong 1921 Merrilliana.
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